Report on Field Observations 4/2003-10/2003

By Bill Pine
Ontario, California

All INSPIRE participants are encouraged to make observations and send their data tapes and logs in for analysis. The *Journal* would like this report to reflect the activities of all observers. Any data is good data! Please send data tapes regardless of how "successful" the session turned out to be.

The guidelines for observations are:

1. Fill out a log cover sheet and data sheets for each observation.
2. Place a voice introduction on each tape indicating name, date and start time.
3. Insert a time mark every two minutes during the observations.
4. Submit the data to:

Bill Pine
Science Department
Chaffey High School
1245 N. Euclid Avenue
Ontario, CA 91762

The observations in this report will be given in chronological order. The convention for naming files is the following:

Name 4-26-03 13UT 06CST

Observer Name Date Start Time UT. Start Time Local

Spectrograms made for data analysis include the first 2 minutes 0-22 kHz range; the first 2 minutes 0-11 kHz range; the first minute 0-11 kHz range and the first 30 seconds 0-11 kHz range. When circumstances dictate, other formats for spectrographic analysis may be used. Spectrograms are also made of any portions of the tape requested by the observer.

On all spectrograms, the frequency range appears at the left of the spectrogram and the time interval appears at the top of the display. The time scale always starts with "0", rather from the actual time. An arrow on a spectrogram indicates the time interval shown on the following display.

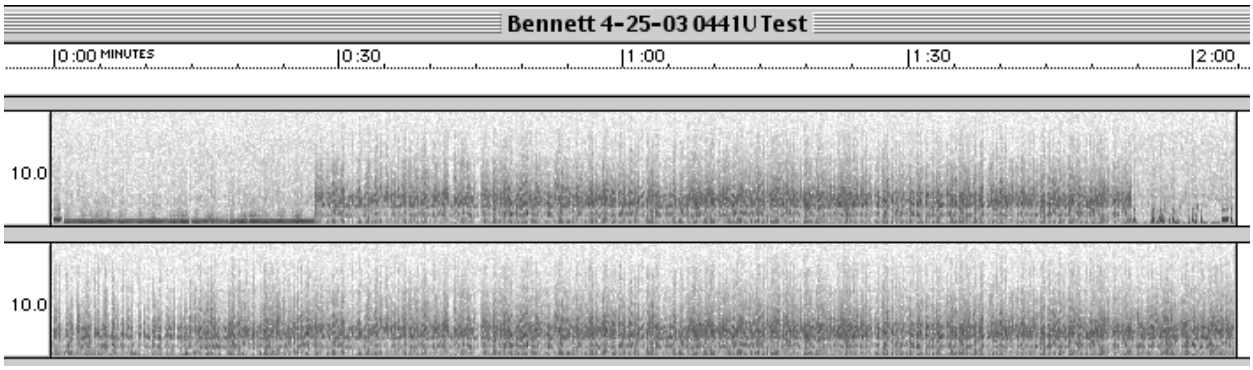
4-25-03 Robert Bennett Las Cruces, NM

Robert's field setup. The INSPIRE antenna is on the right. The telescoping antenna on the left is for a scanner. Robert also has an antenna for his amateur transceiver for communicating with home.

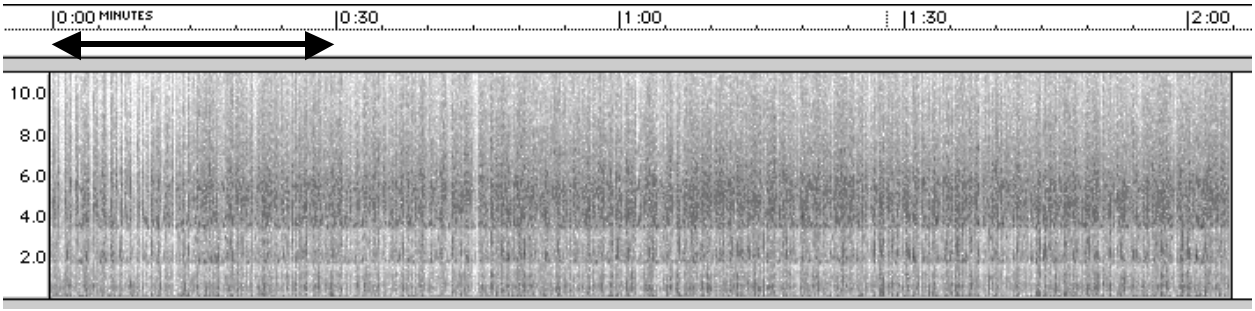
This view is through the windshield showing the receiver and recorder on a board from the dash to the passenger seat back.

Bennett

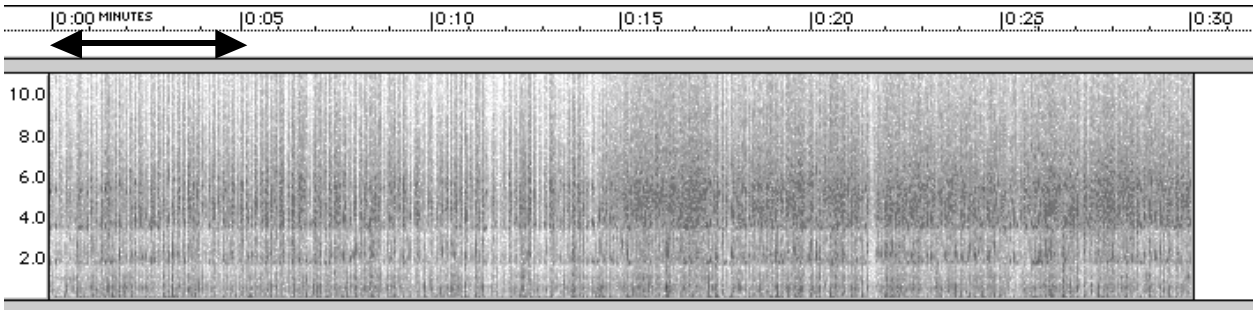
Robert's first session was an evening session. The purpose of the session was to test a repaired Marantz recorder. Most of Robert's observations are made in the morning, so this session was unusual. Evening sessions are often characterized by the presence of tweeks that appear near sunset and continue through the night. Robert's tapes show this well.



The Marantz recorder is a stereo recorder. Robert puts WWV on one track (the top one) for time marks and data on the other track. When time marks are not being taken, the top track is switched so that data appears on both tracks.

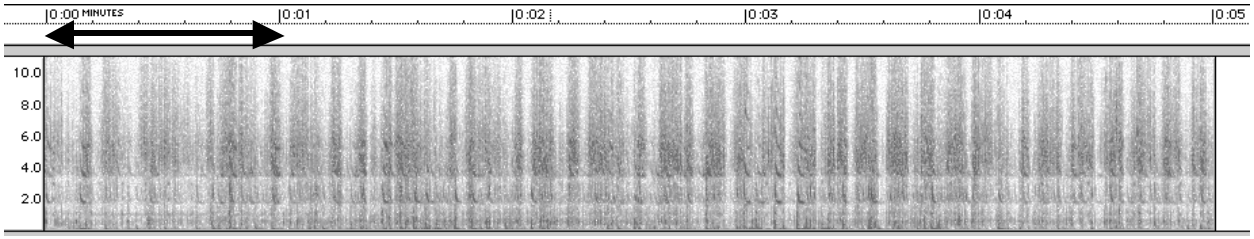


This is the data track only. The arrow indicates that the next spectrogram is of the first 30 seconds.

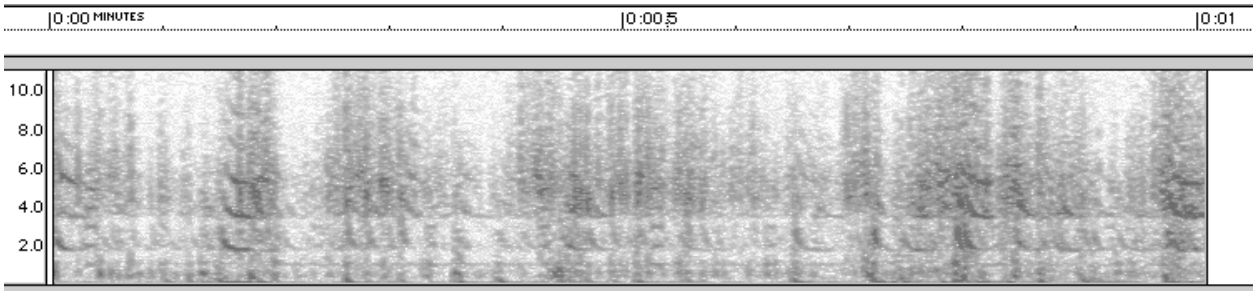


The next spectrogram is of the first 5 seconds.

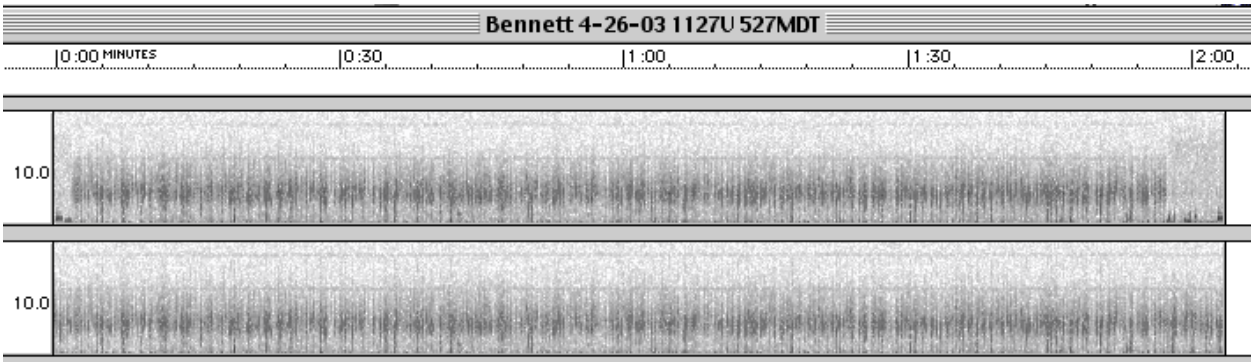
Bennett



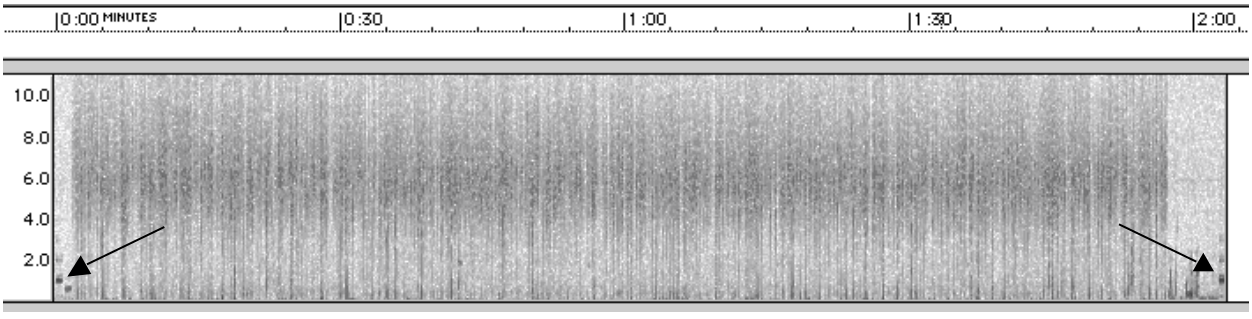
The next spectrogram is of the first 1 second to show the tweeks individually.



The strength of the tweeks is indicated qualitatively by the presence of several harmonics of the stronger tweeks. The tweek density is more than 10 tweeks per second.



The next morning, Robert was observing starting at 5:27 AM MDT (1127 UT).



The arrows above point to the 1 kHz WWV tones at 112700 UT and 112702 UT.

Bennett

Below is a sample from Robert's log for 4-26-03.

DATA COLLECTION FORM

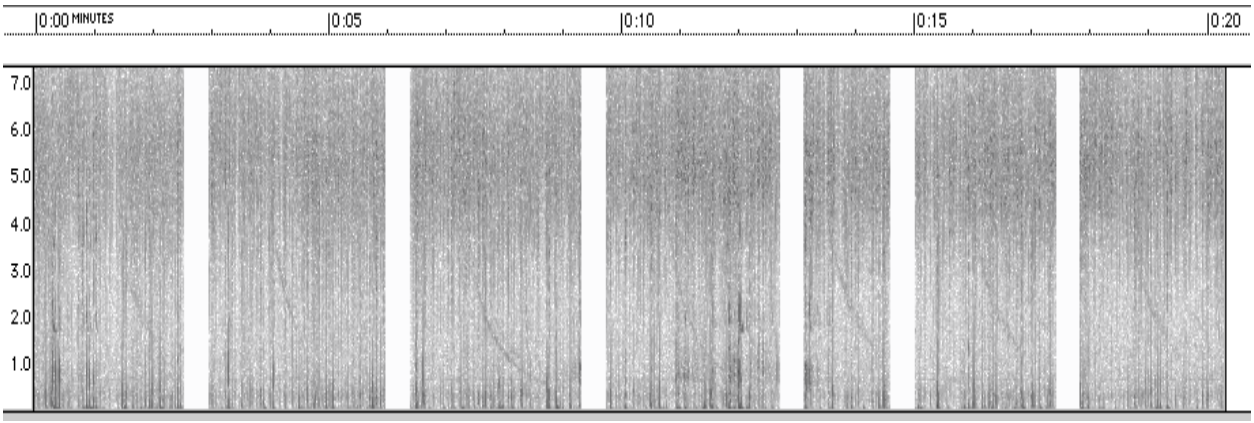
0530 MDT Start

Operation: Coordinated Monitoring

Date: 26 Apr 03.

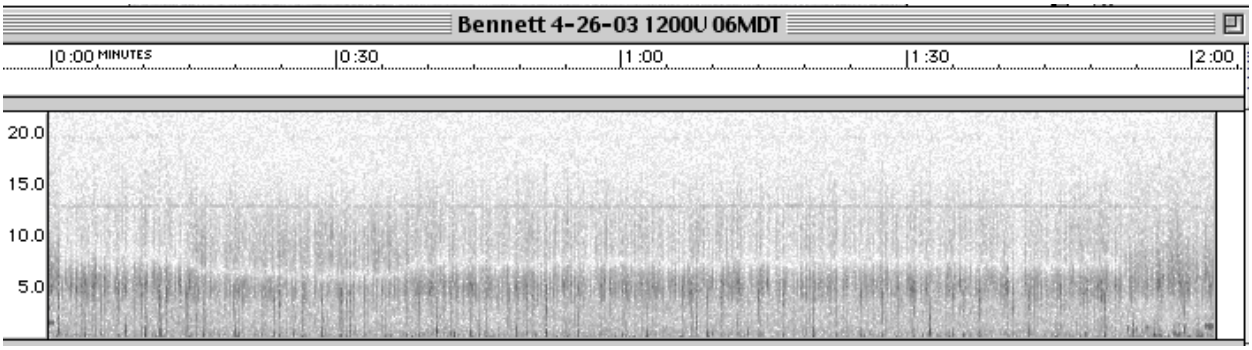
TAPE RECORDER COUNTER	TIME UT	EVENT	SFERIC LEVEL	COMMENTS
0		Voice Announcement		Antenna filter
18	1127	WWV	7-8	is "in", too much
		many strong Tweeks		Loran. Recorder
36		Triggered whistler		on 2, Limiter in,
52		whistler		Natural Radio signals
57	1129	WWV		Strong.
64		whistler		WWV on Right
78		strong whistler		channel.
108	1132	WWV		
124		weak whistler		Very dry - I am
137		strong whistler		getting a lot of
140	1134	WWV		static Electricity.
141		dual whistlers		
183	1137	WWV		Starting to get light
203		strong whistler		outside.

Spectrograms of some of the whistlers logged above are shown below.

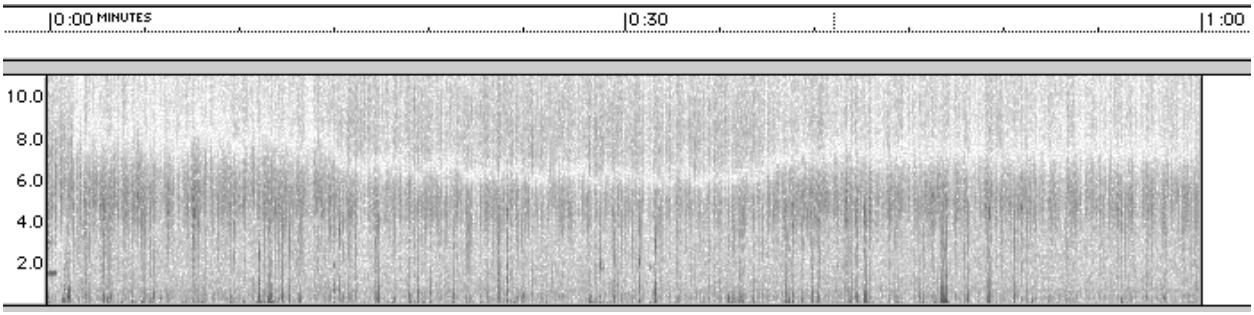


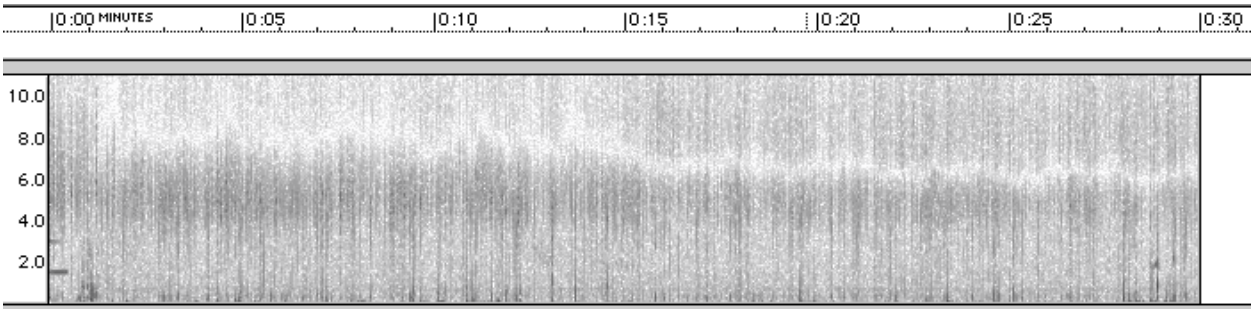
One thing that was unusual about this session is that the sferic density was high. The whistlers are easily heard on the tapes, but are harder to find in the spectrograms because of the high sferic density. Whistlers are generally more common (or easier to hear?) when the overall sferic density is lower.

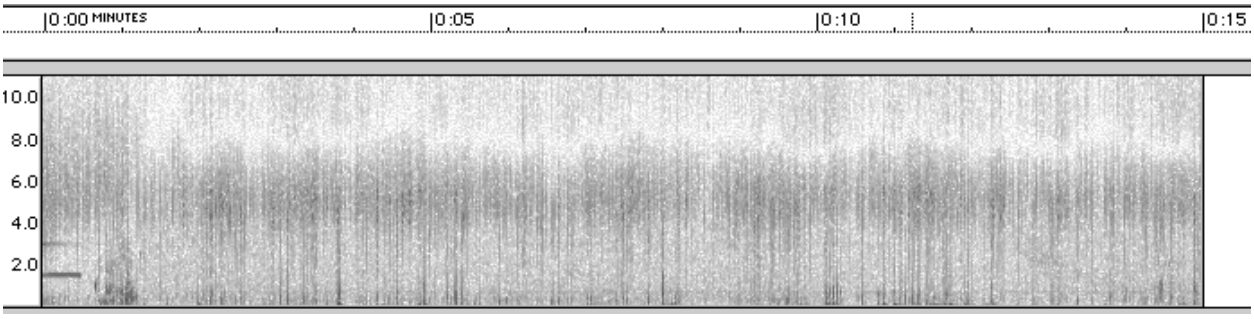
Bennett



This data is part of the coordinated observations starting at 6 AM MDT (1200 UT). The sferic density has dropped somewhat and whistlers are less common.





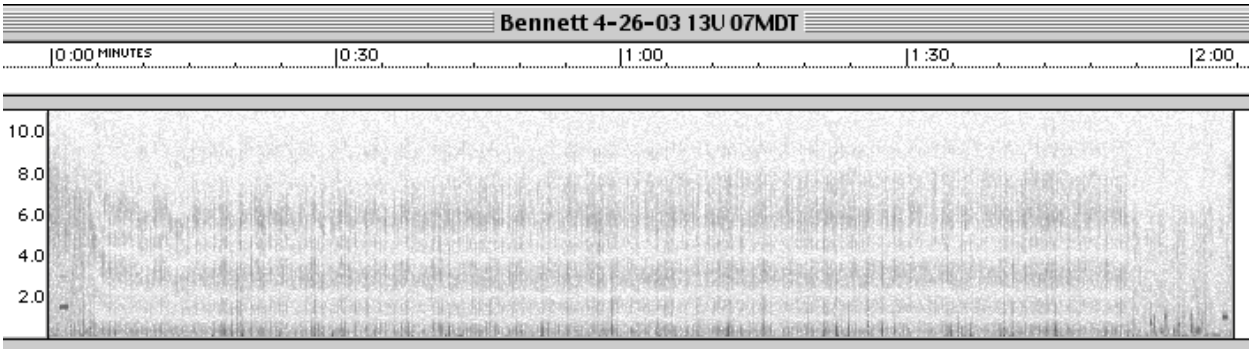


Bennett

The view from Robert's "quiet site". Buildings in the distance are the NASA TDRSS satellite communication facility.

The approach road to Robert's site. After a rain, this road is impassible, even with 4-wheel drive. It is strictly "Driver beware!".

Bennett



The log for the above session is shown below. Whistlers have stopped and sferic density has declined to "near normal daytime levels". Notice the log entry "WWV starting to fade" at 1315UT indicating the change in the ionosphere.

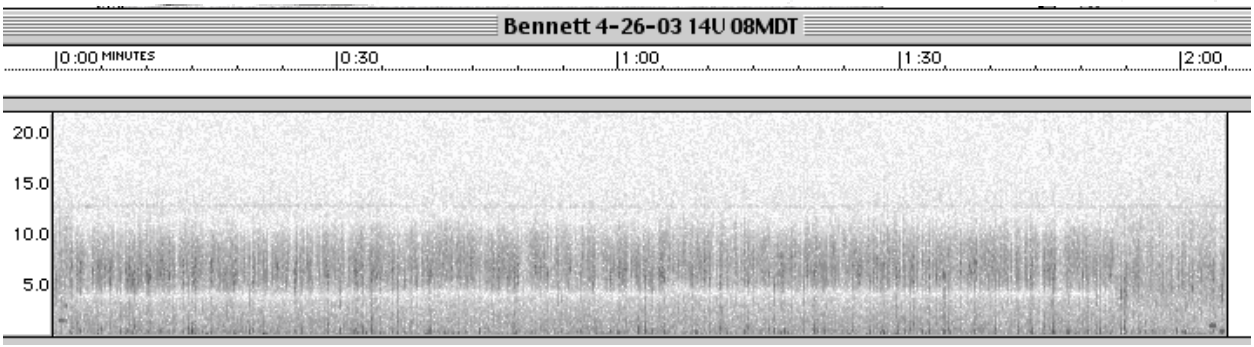
DATA COLLECTION FORM

Operation: Coordinated monitoring 0700-0715 MDT

Date: 26Apr03

TAPE RECORDER COUNTER	TIME UT	EVENT	SFERIC LEVEL	COMMENTS
0		Voice Announcement		
11	1301	WWV	5-6	1. Ant attenuator
49	1302	WWV		"in", Recorder
				limiter "IN".
58		Strong static caused		Record level ok.
		by me moving RX.		4.
86-90		movement (me) noise		2. Levels weaker
118	1306	WWV		than at 0600,
134	1307	WWV		Near Normal
164	1309	WWV		daytime levels.
172		Whistler [redacted]		
192	1311	WWV		
219	1313	WWV		
244	1315	WWV	WWV	starting to Fade.

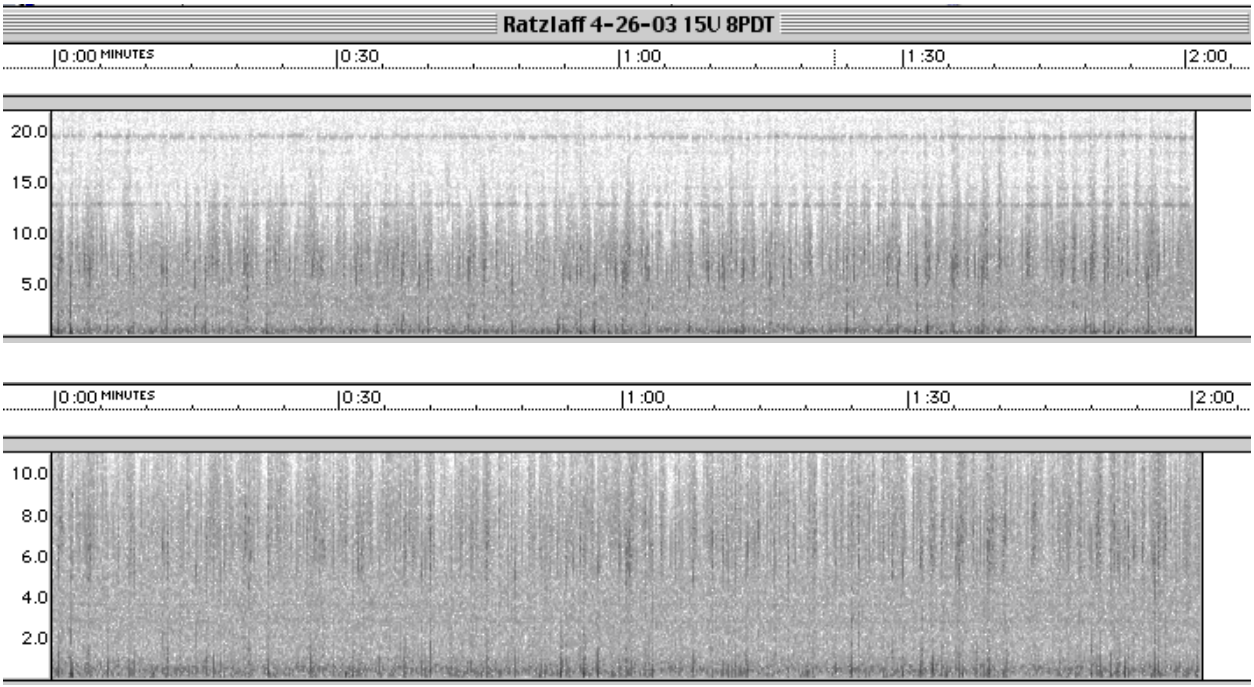
26Apr03E



4-26-03 Steve Ratzlaff Elgin, OR

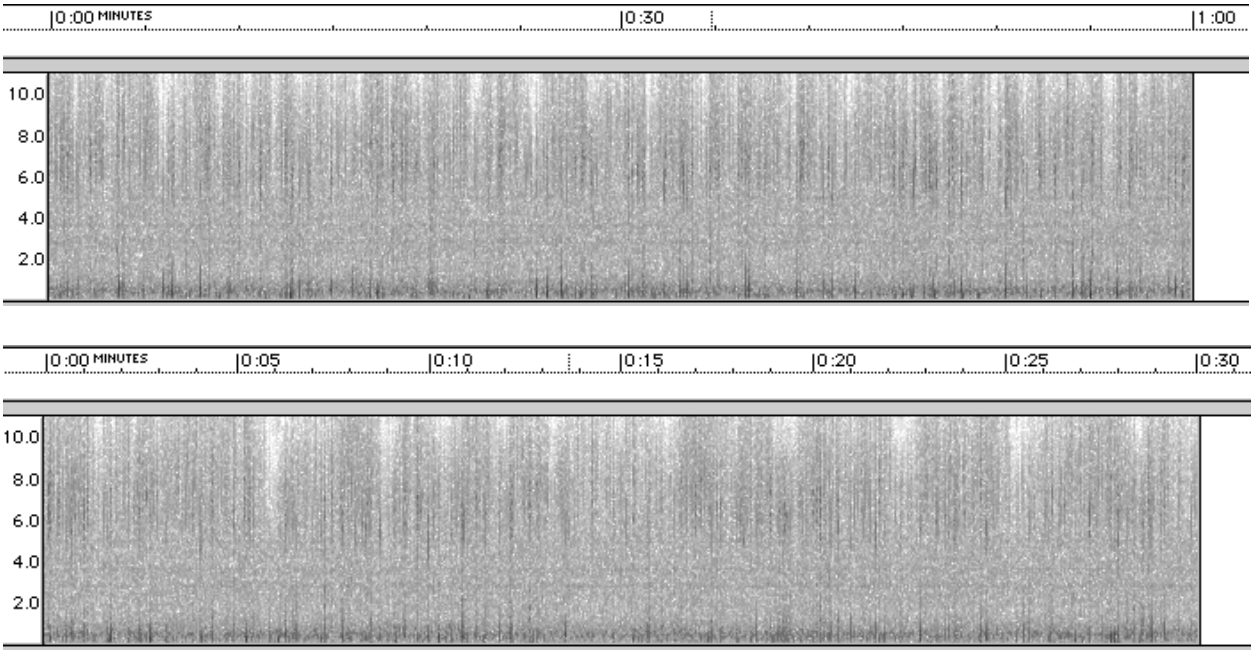
"For the Saturday session I arrived at the site about 30 minutes early. I was planning to use the loop antenna and receiver; everything was already setup and in place, all I needed to do was put an external ground rod out, attach the loop preamp and connect the remote feedline to the receiver in the vehicle where I do my monitoring, about 130 feet away from the loop. This distance is necessary to prevent recorder motor whine from being picked up by the loop. All this takes no more than 5 minutes to be set up and ready for listening. But my initial check of the loop receiver showed nothing heard, not even background noise. Quick checks of the equipment didn't find anything obviously wrong. I'd used this setup just the previous day with no problems.

Time was running out to meet the 8 a.m. session start time. I hastily set up my vertical mast, got the VLF3 set up, got the recorder set up with the VLF3. Finally I was hearing VLF in the headphones, but not using the loop receiver. And I was already 7 minutes late in the session. But I got the final 5 minutes recorded of the 8a.m. session, and was also rewarded with a weak whistler. There was no other VLF activity occurring, like chorus or frequent whistlers—just strong sferics."

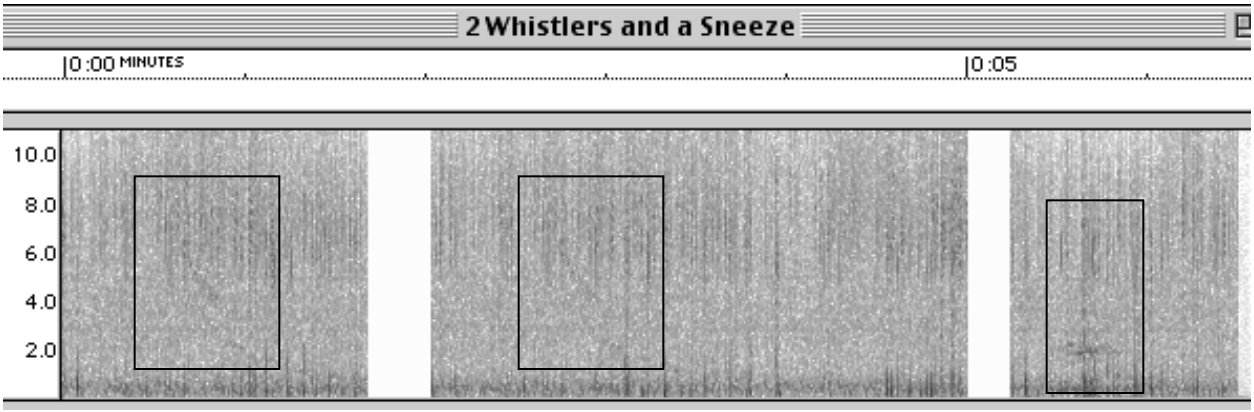


Strong, dense sferics.

Ratzlaff

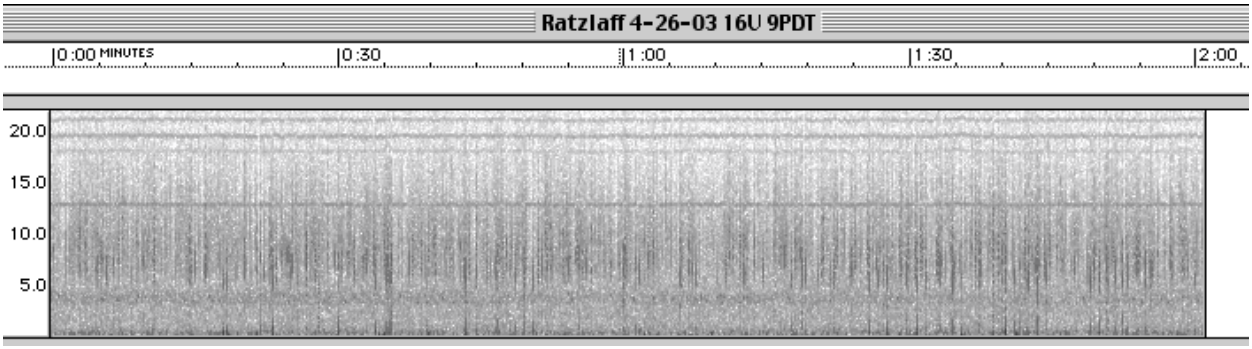


"Nine to 10 minute—10:16 I sneezed and somehow this is received and is on tape, even though no mic is attached or turned on—this is "unnatural" VLF data!"

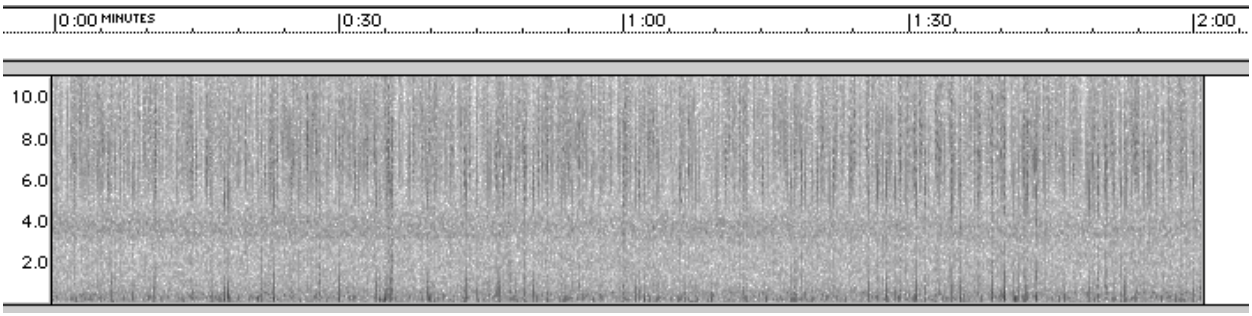


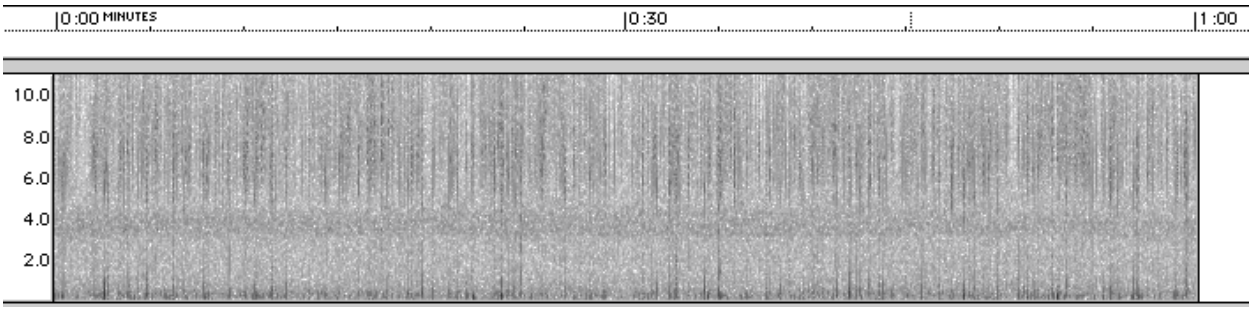
Whistler Whistler Sneeze

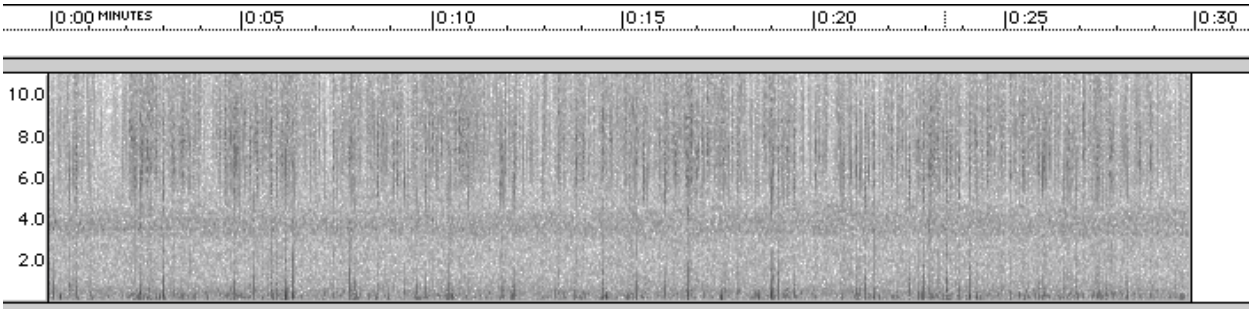
Ratzlaff



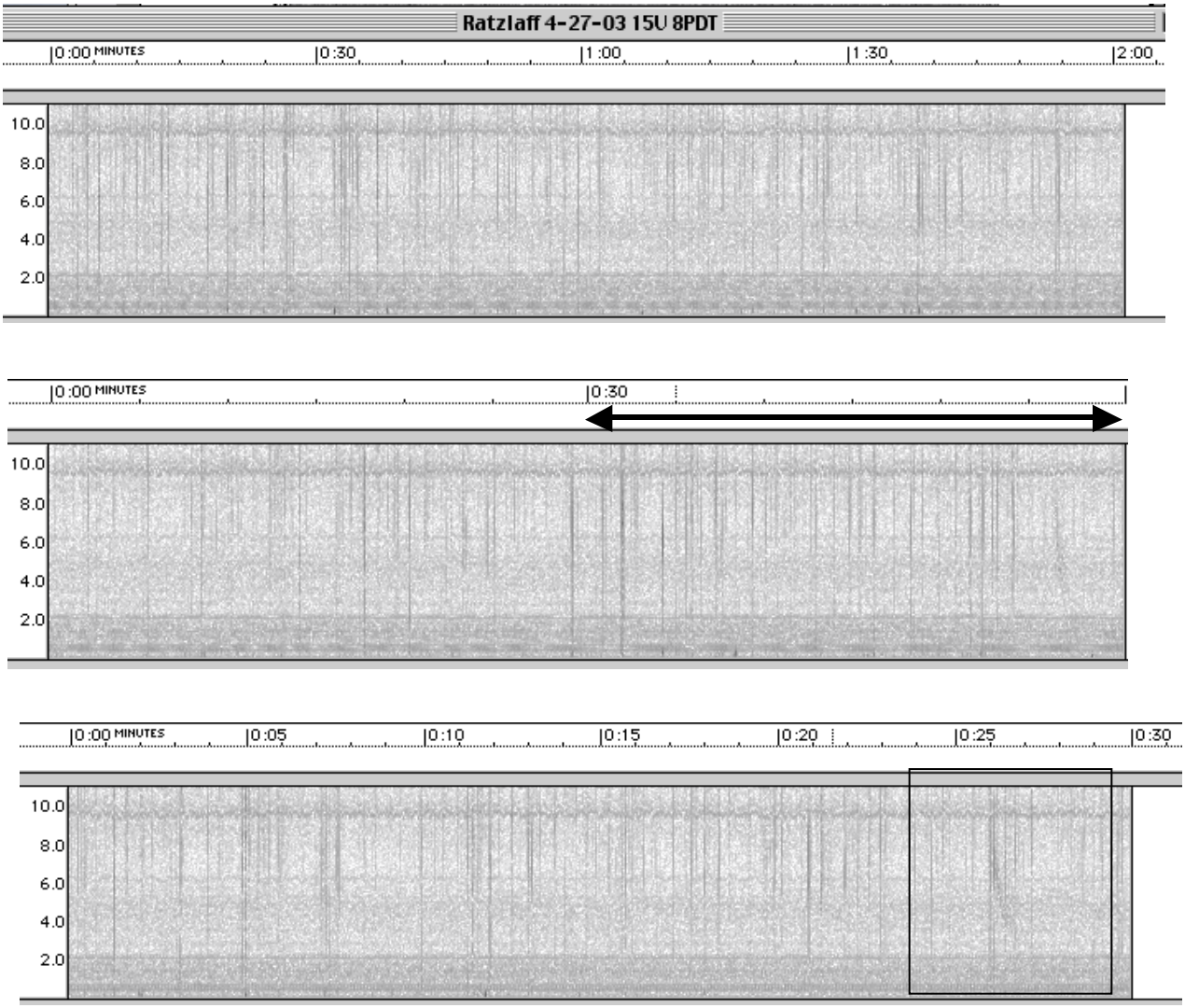
Still strong, dense sferics.



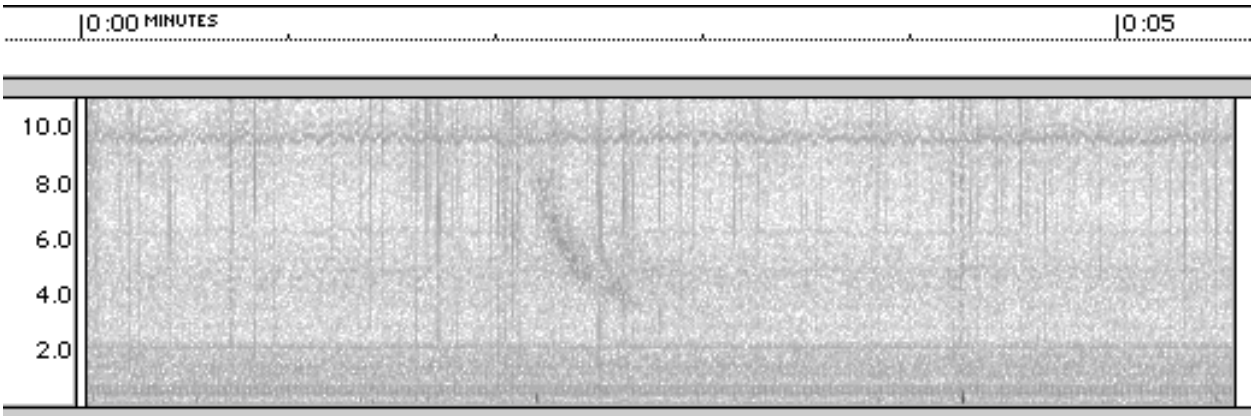




Ratzlaff

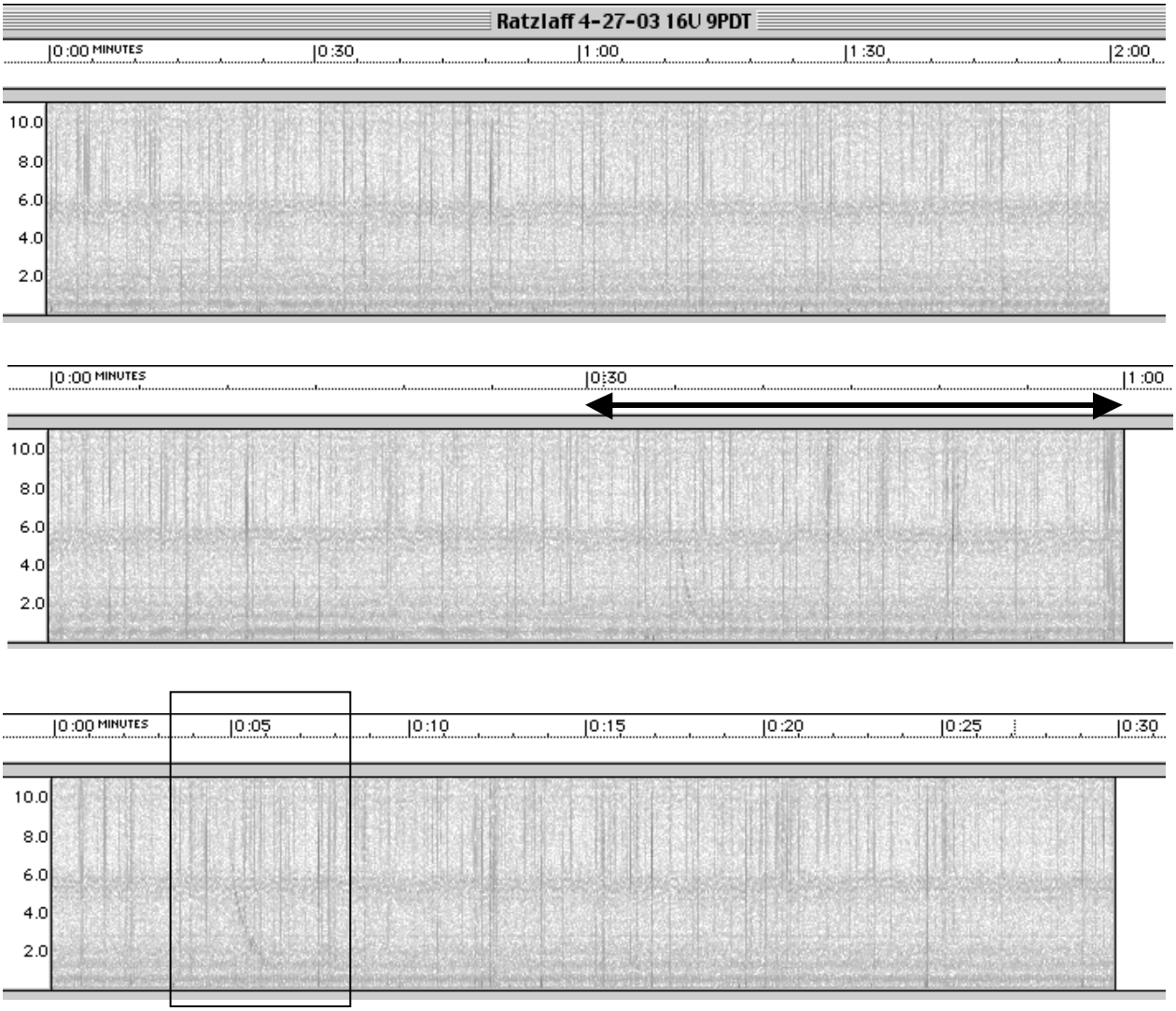


"One to two minute—1:03 high-pitched fast weak whistler. 1:46 medium level sferics crash "

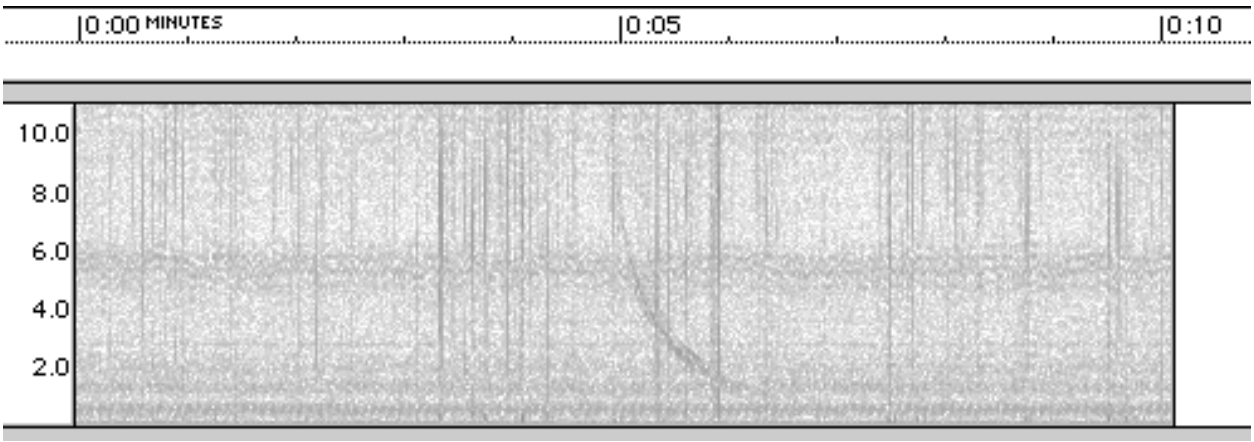


Whistler logged at 1:03 shows up at :57 seconds due to poor time sync with spectrogram.

Ratzlaff



Whistler.



Close up of whistler.

Ratzlaff

"4/27/03 Sunday

Large 130 foot circumference loop antenna and receiver used for both Sunday sessions. Hum is significantly higher as the loop is a lot more sensitive than the VLF-3 e-field receiver with 25 foot vertical antenna..

9a.m./1600UTC, 4/27/03 Sunday session; continuing to record data with the loop receiver (Tape has a 15 second blank period between end of 8a.m. session and start of 9a.m. session—data playback begins at exactly 9:00:00a.m. (There is no voice data on this tape.)

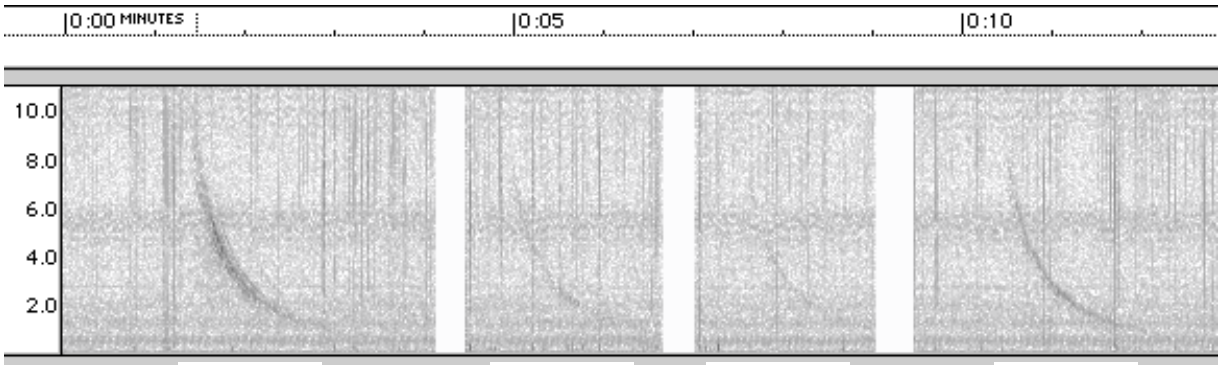
Zero to one minute--:10—faint chorus noted in the background, throughout this session, too weak to be recorded. Sounds like medium-pitched chirping.

One to two minute—1:28 sferic crashes

Two to three minute—2:12medium level high-pitched whistler lasting 1.5 seconds

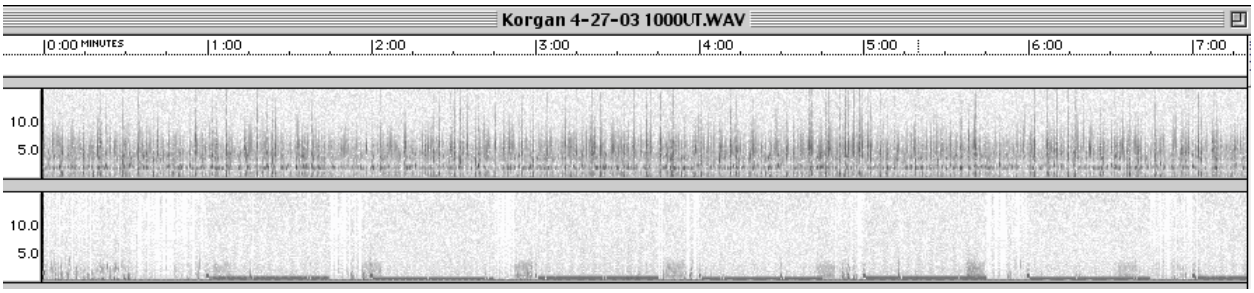
Three to four minute—3:49 long weak whistler

Four to five minute—4:19 weak whistler; 4:44 long medium level whistler"

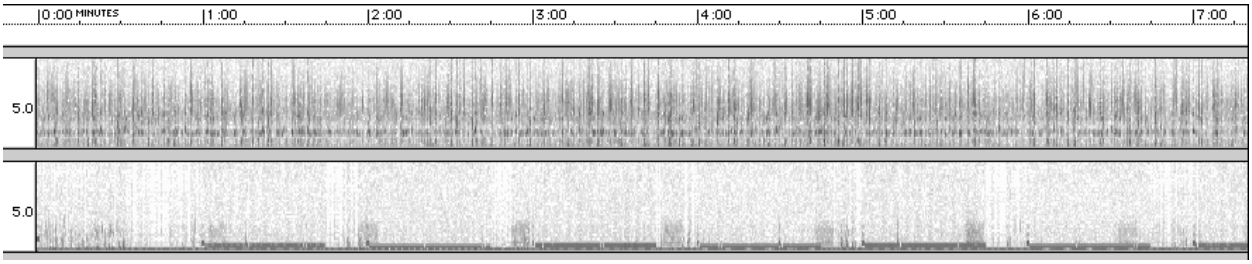


1602:12 1603:49 1604:19 1604:44

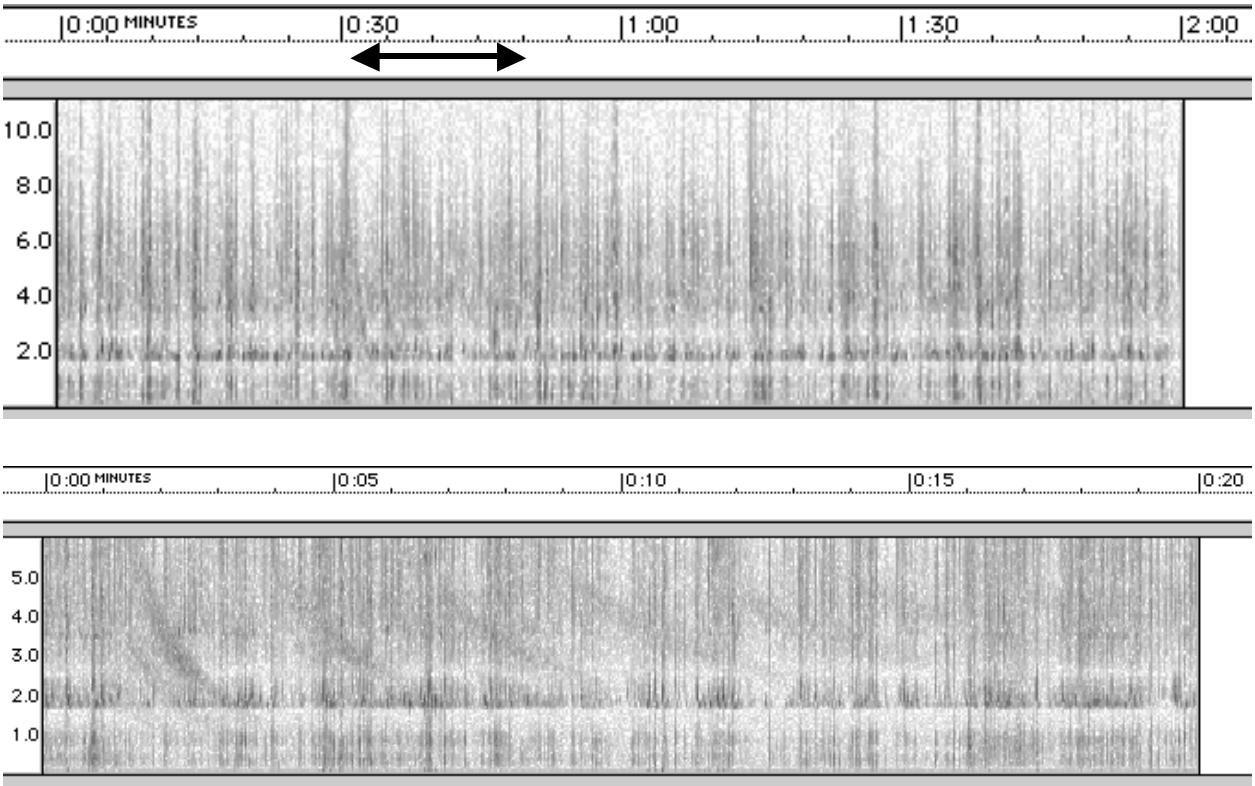
4-27-03 Shawn Korgan Gilcrest, CO



Shawn provided .WAV files of his sessions. This is a 7-minute file starting at 10 UT on 4-27-03. Data on the top track, WWV on the bottom track.

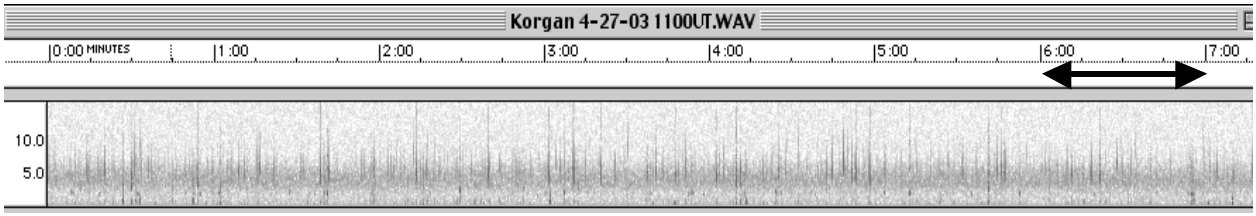


The first 2 minutes.



Whistler with many echoes.

Korgan



pg1

INSPIRE Data (copy as needed)

INSPIRE Observer Team DAWN RISERS Team Number: J-1

Coordinated Observation Date: April 27, 2003 Receiver SK-1

Tape Start Time (UT) 11:00 Tape Start Time (Local) 5:00 AM MST

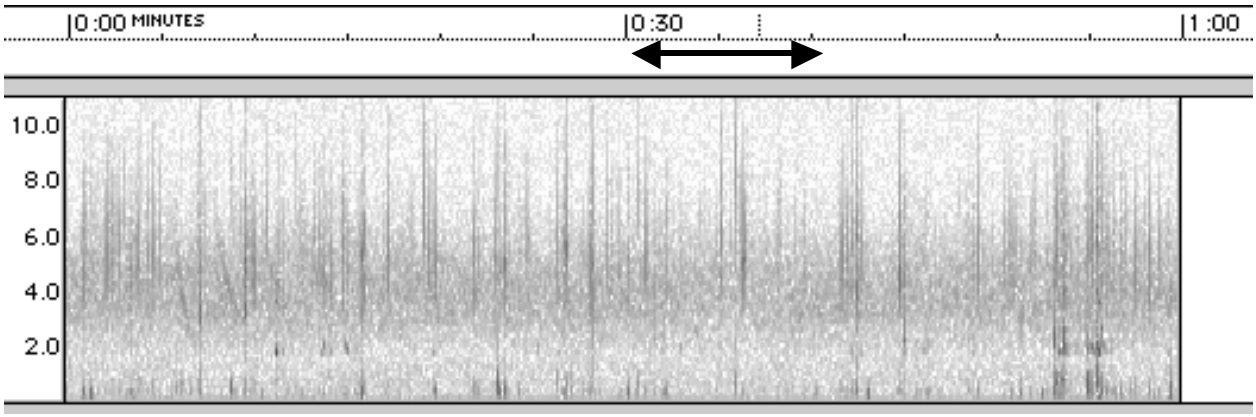
Local weather: Calm, partly cloudy, 45°

Code: M - Mark (WWV or Voice) S - sferics T - tweek W - whistler A - Alpha C – chorus
Sferic Density: D: 3 Scale of 1-5 (1 – Very Low, 3 – Medium, 5 – Very High)

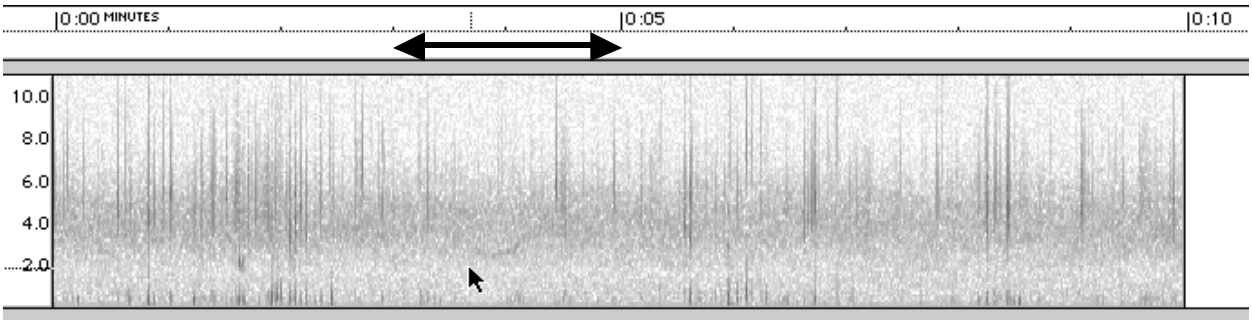
Time (UT)	Entry		Observer
00 01	M-WWV M-V STC(W)	D: 1	
11	M-WWV M-V STC(W)	D: 1	
29	M-WWV M-V STC(W)	D: 1	
35	M-WWV M-V STC(W)	D: 1	
39	M-WWV M-V STC(W)	D: 1	
48	M-WWV M-V STC(W) with echoes	D: 2	
53	M-WWV M-V STC(W)	D: 1	
02 03	M-WWV M-V STC(W)	D: 1	
15	M-WWV M-V STC(W)	D: 1	
53	M-WWV M-V STC(W) frac. tops?	D: 1	
04 30	M-WWV M-V STC(W)	D: 1	
05 39	M-WWV M-V STC(W) with several echoes	D: 1	
55	M-WWV M-V STC(W)	D: 1	
06 07	M-WWV M-V STC(W) with many echoes	D: 2	
27	M-WWV M-V STC(W)	D: 1	
34	M-WWV M-V STC(W) emission	D: 1	
52	M-WWV M-V STC(W)	D: 1	
58	M-WWV M-V STC(W)	D: 1	

Note the emission logged at 110634 MDT. That is the target.

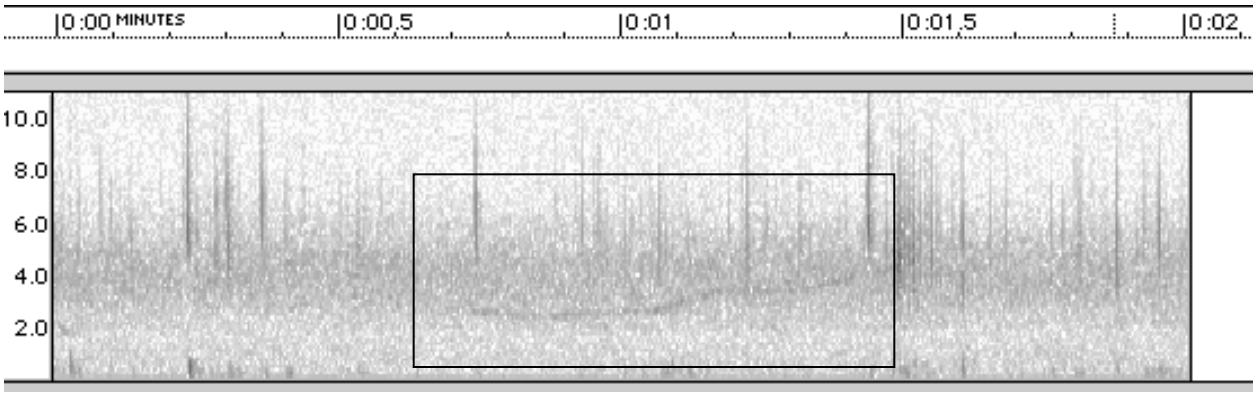
Korgan



From time 1106 UT to 1107 UT.

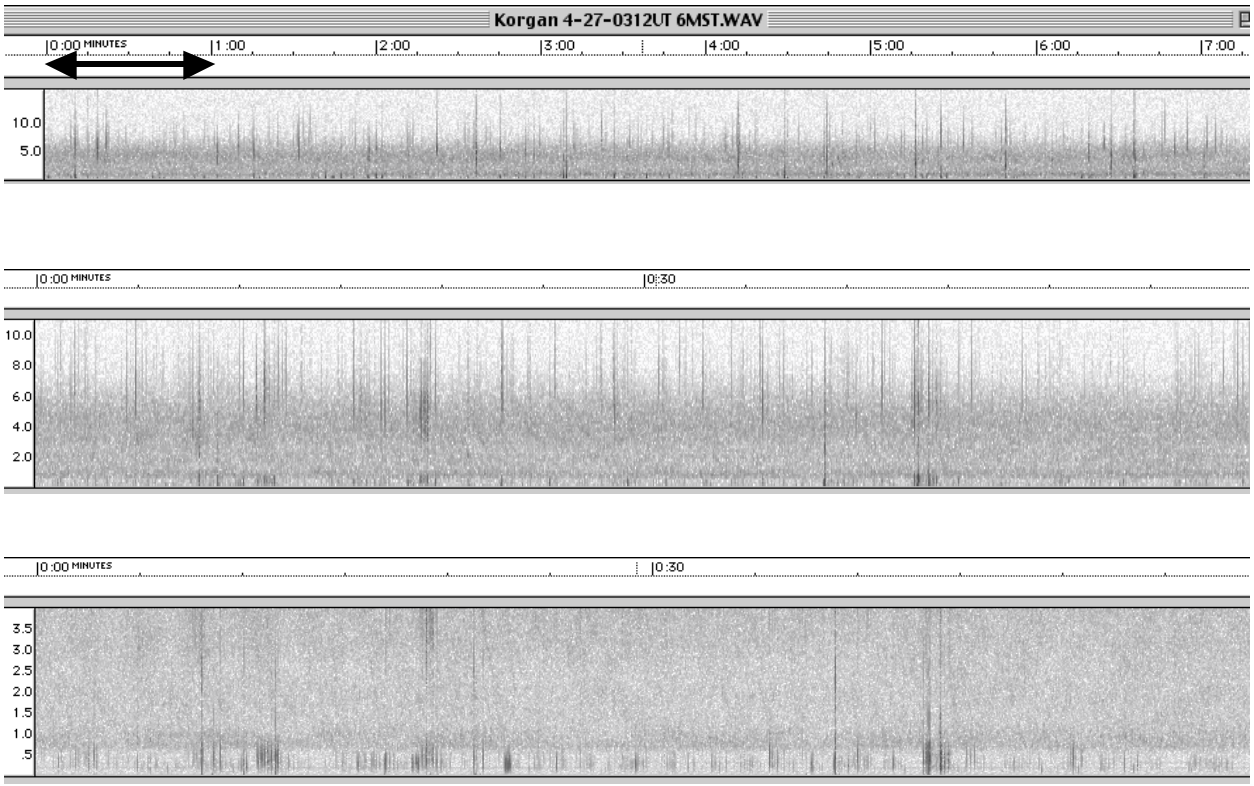


The small arrow points to the emission.

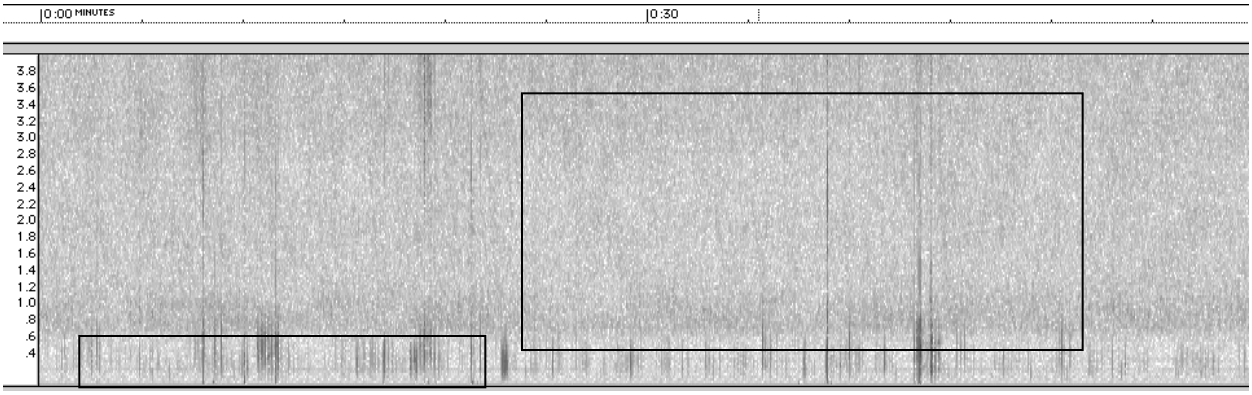


Emission logged at 110634 UT.

Korgan

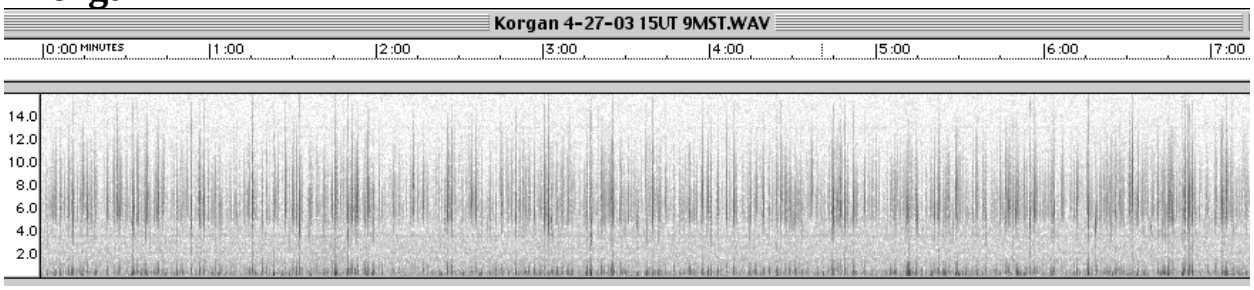


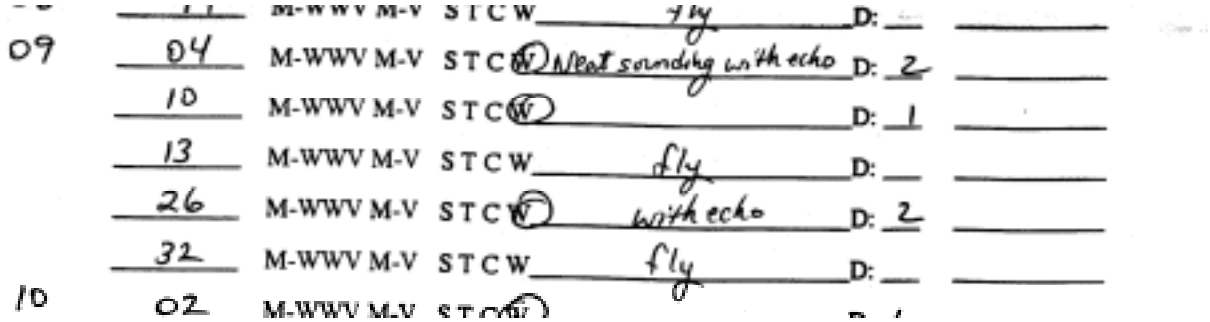
The first minute using a frequency range of 0-4 kHz.

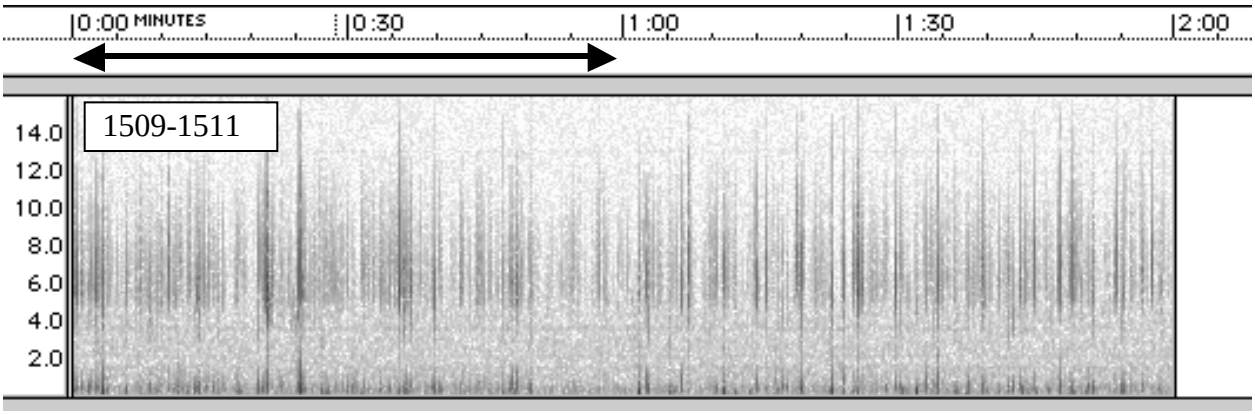


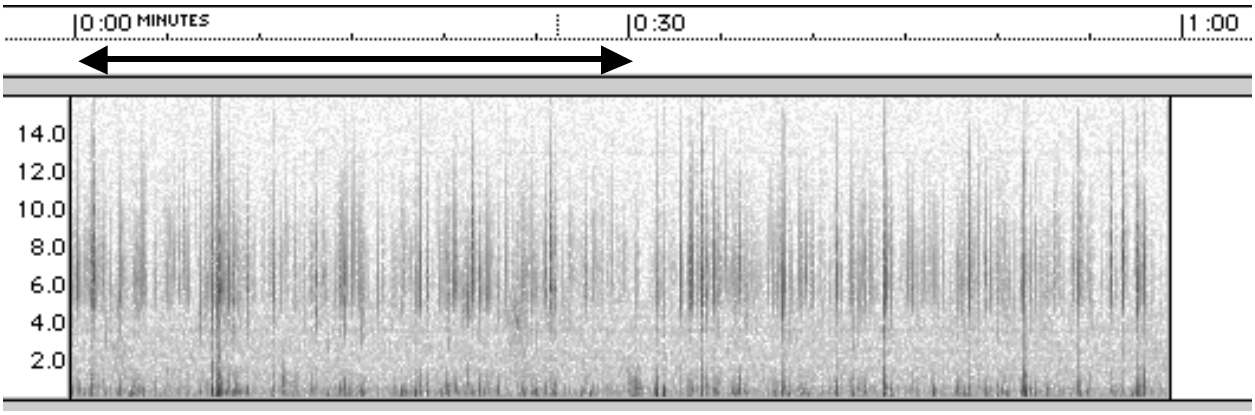
He first rectangle shows the strong sferics that are getting through the high pass filter of the VLF3. The second rectangle shows the sferics as a dense collection of vertical lines.

Korgan

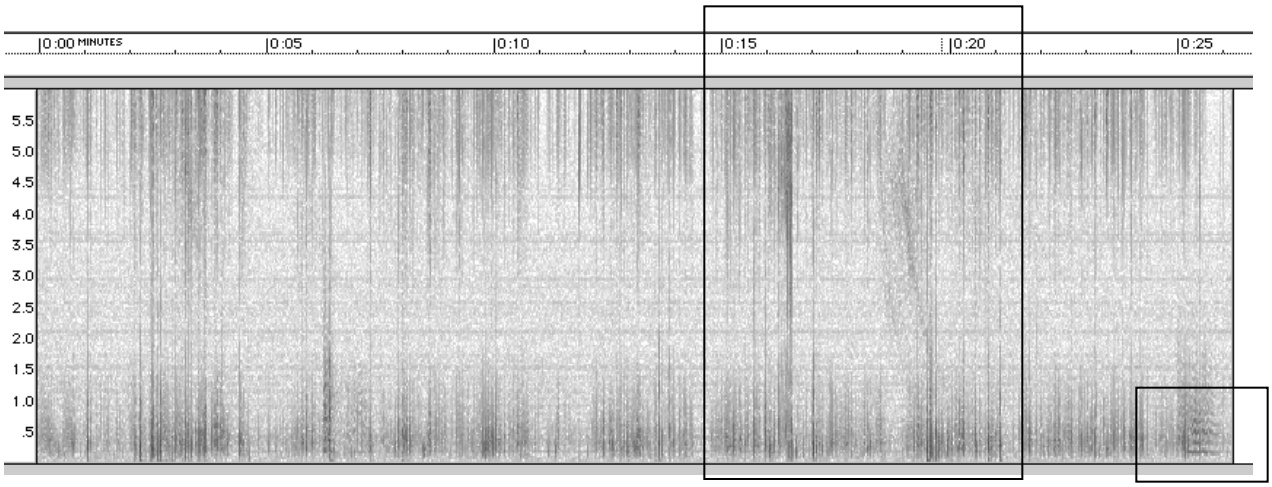

Korgan 4-27-03 15UT 9MST.WAV
0:00 MINUTES
1:00
2:00
3:00
4:00
5:00
6:00
7:00
14.0
12.0
10.0
8.0
6.0
4.0
2.0


M-WWV M-V STCW fly D:
09 04 M-WWV M-V STCW N/pol sounding with echo D: 2
10 M-WWV M-V STCW D: 1
13 M-WWV M-V STCW fly D:
26 M-WWV M-V STCW with echo D: 2
32 M-WWV M-V STCW fly D:
10 02 M-WWV M-V

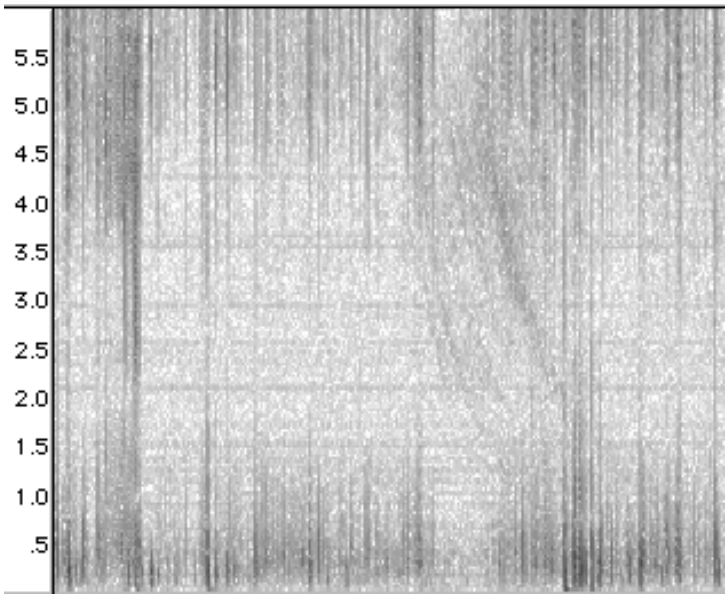

0:00 MINUTES
0:30
1:00
1:30
2:00
1509-1511
14.0
12.0
10.0
8.0
6.0
4.0
2.0


0:00 MINUTES
0:30
1:00
14.0
12.0
10.0
8.0
6.0
4.0
2.0

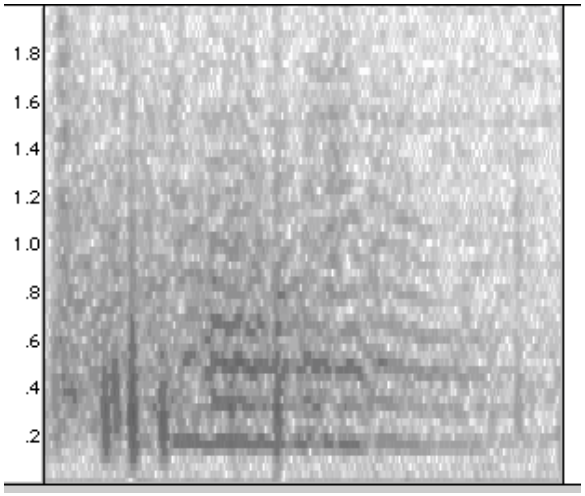
Korgan



The first box holds a whistler; the second is the fly.



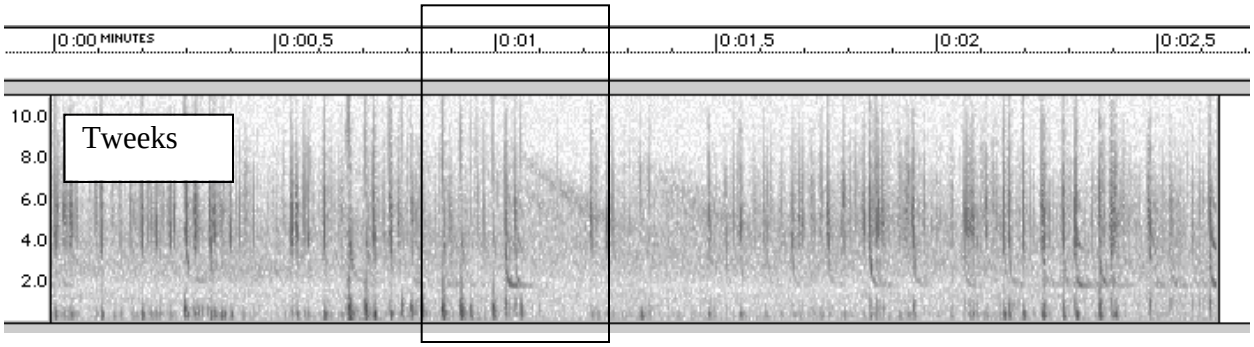
Whistler logged at 150926 “with echo”. On closer examination of the spectrogram, it is actually a double whistler and a 2-hop one at that. The olriginating sferics appear at the far left of the sample.

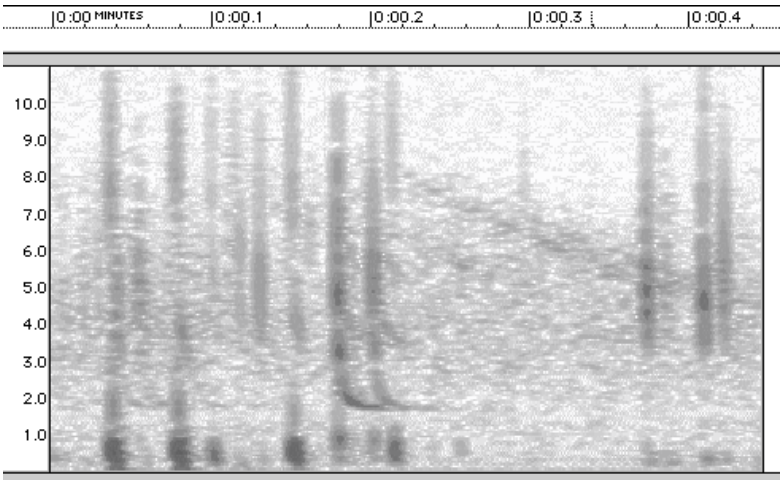


The characteristic signal from a fly!

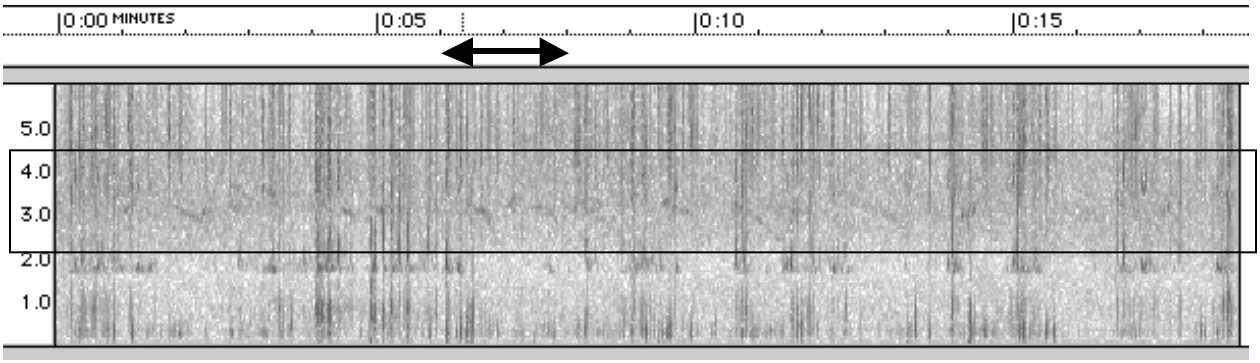
Korgan

Shawn included some miscellaneous signals recorded on April 27, 2003.



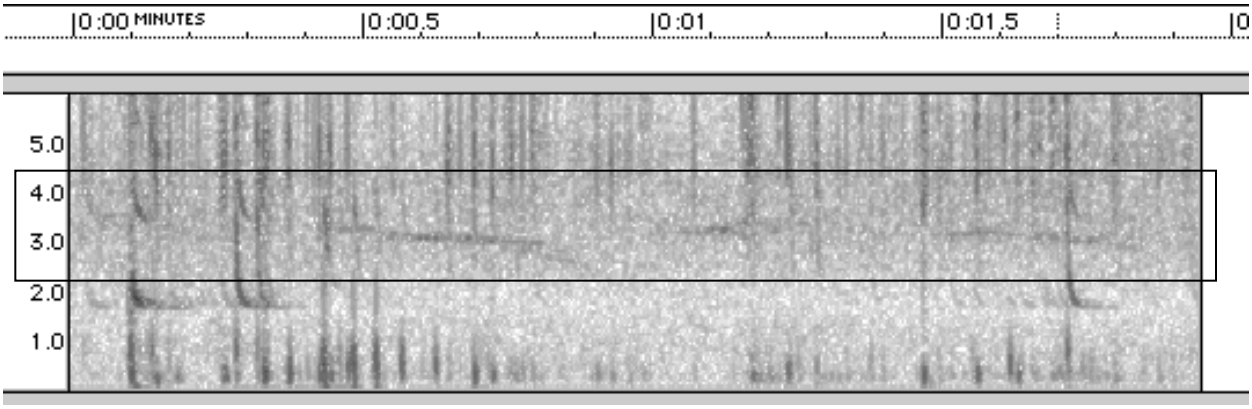


Close up of a double tweek with a whistler in the background.

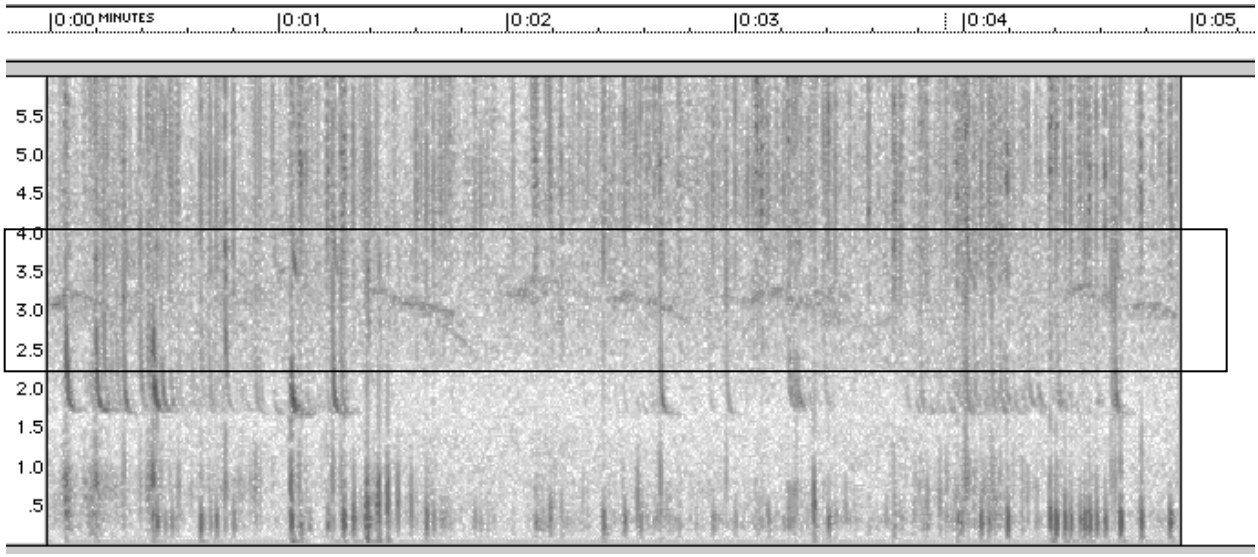


Chorus

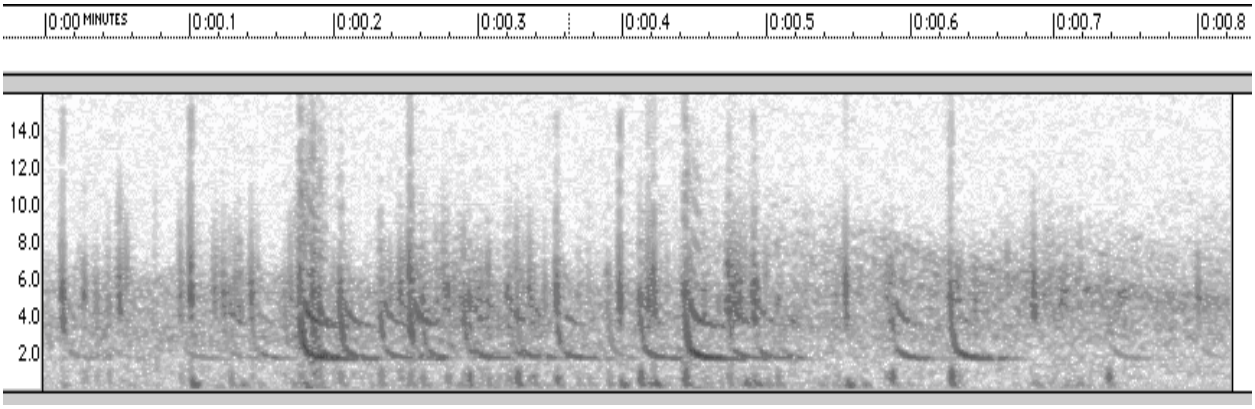
Korgan



Close up of the chorus emissions.



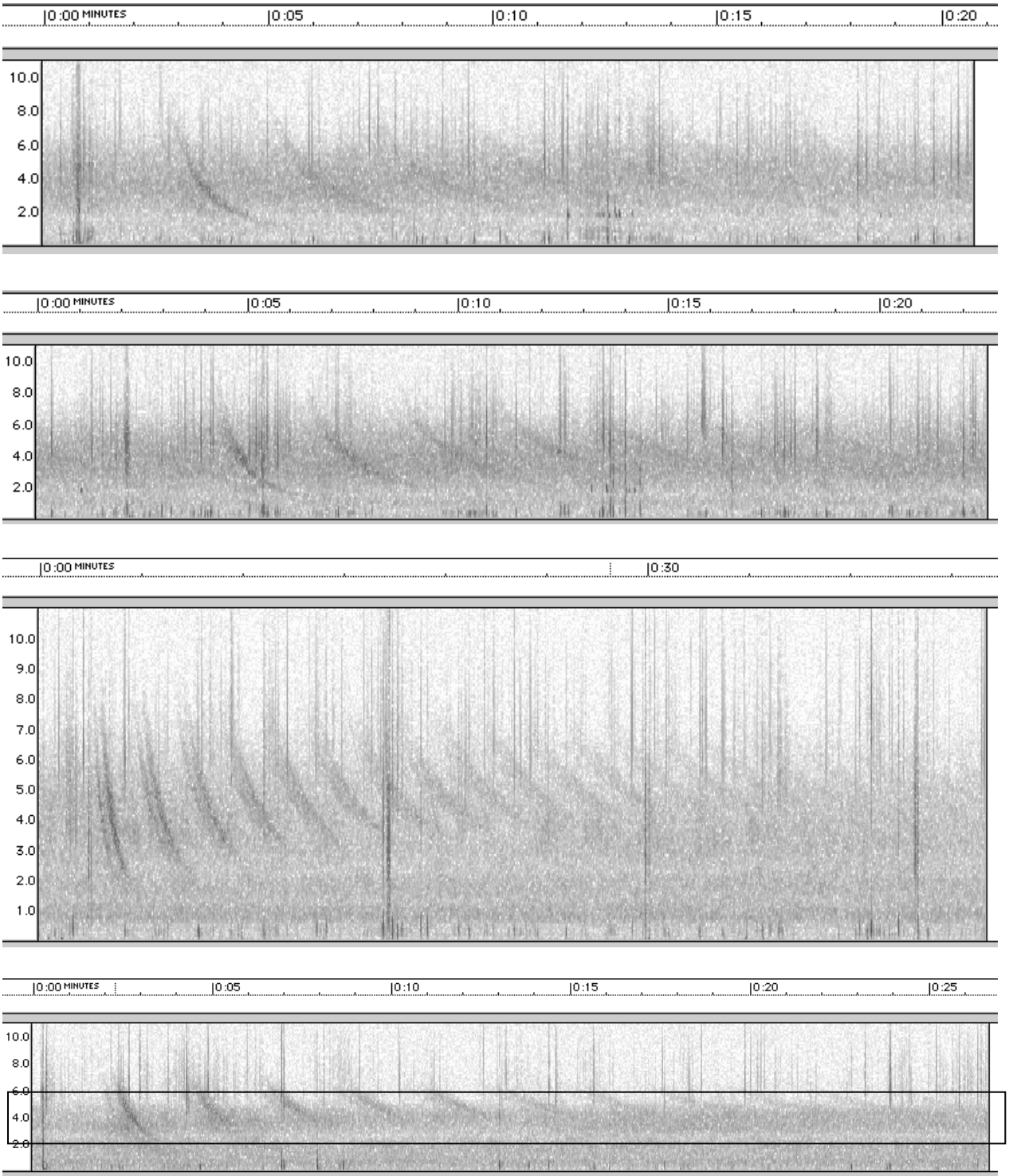
More chorus.



A 0.8 second spectrogram showing dense tweeks.

Korgan

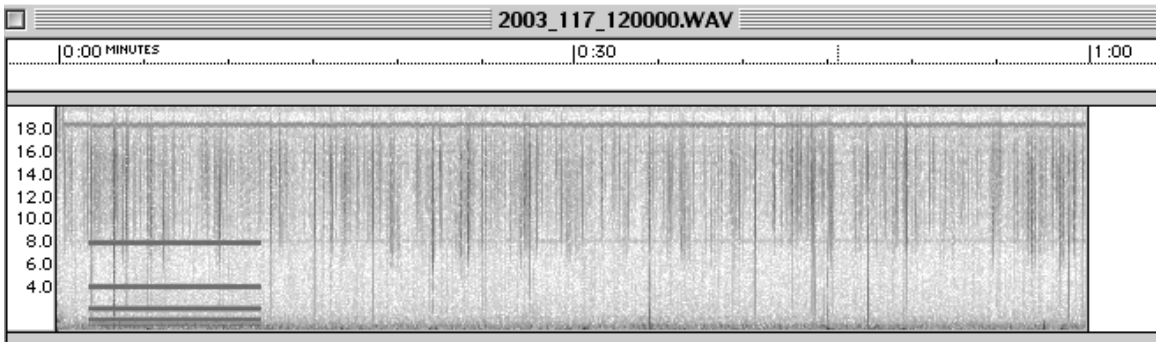
2-hop whistlers with echo trains.



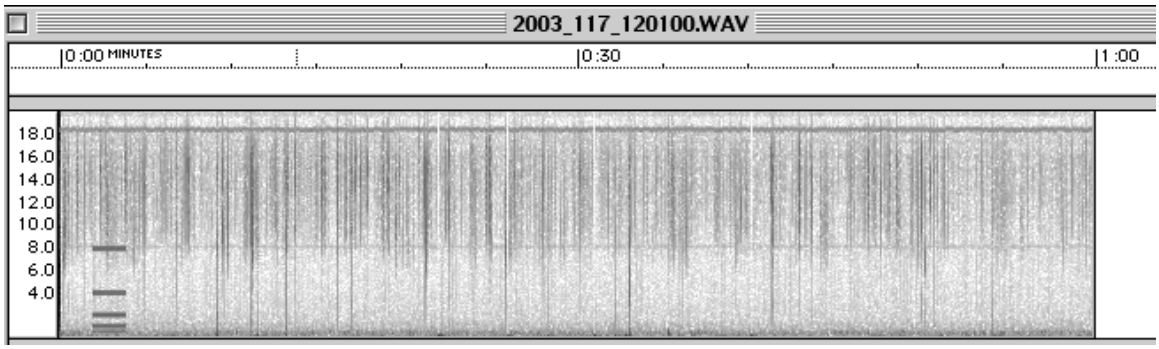
The box contains a band of hiss.

4-27-03 Andrew Collier Durban, South Africa
University of Natal

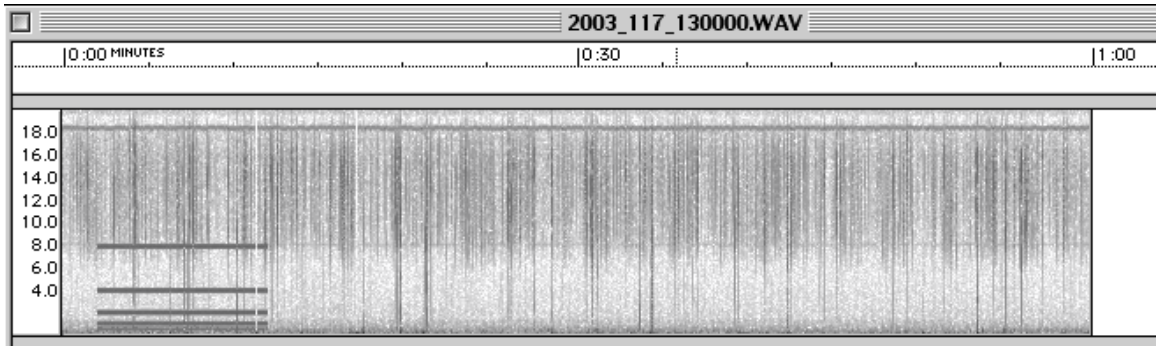
Andrew and Shawn Korgan did some coordinated observations with Shawn observing in Colorado and Andrew observing remotely with a receiver located on top of Mount Vesleskarvet in Antarctica. Andrew's observations consisted of stereo recordings of two loop antennas, one oriented north-south and the other oriented east-west.



First one minute starting on April 27 at 1200 UT.

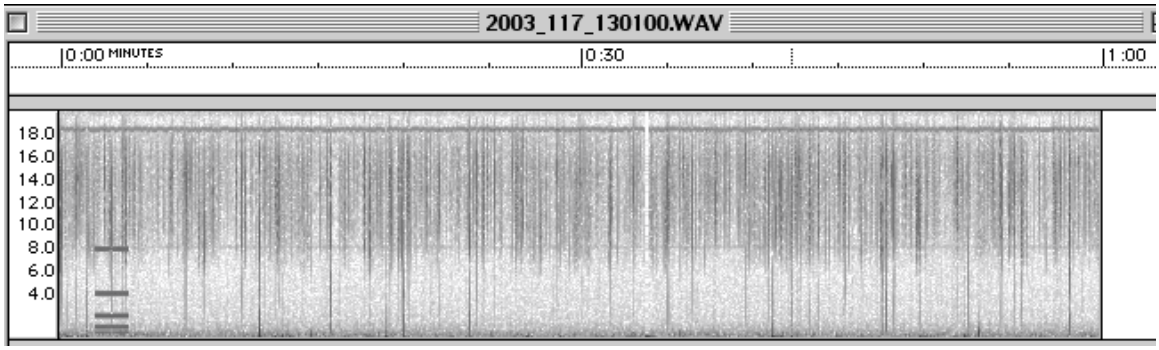


Second minute of the 1200 UT hour. Note the time mark tone near the start of each minute. The tone on the hour (1200 UT) has a longer duration that the other minute tones.



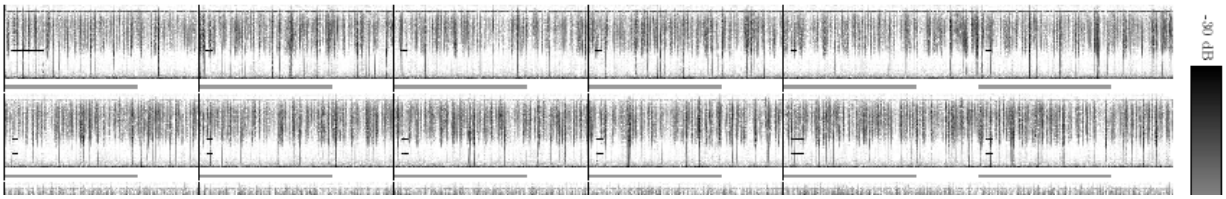
1300 – 1301 UT

Collier

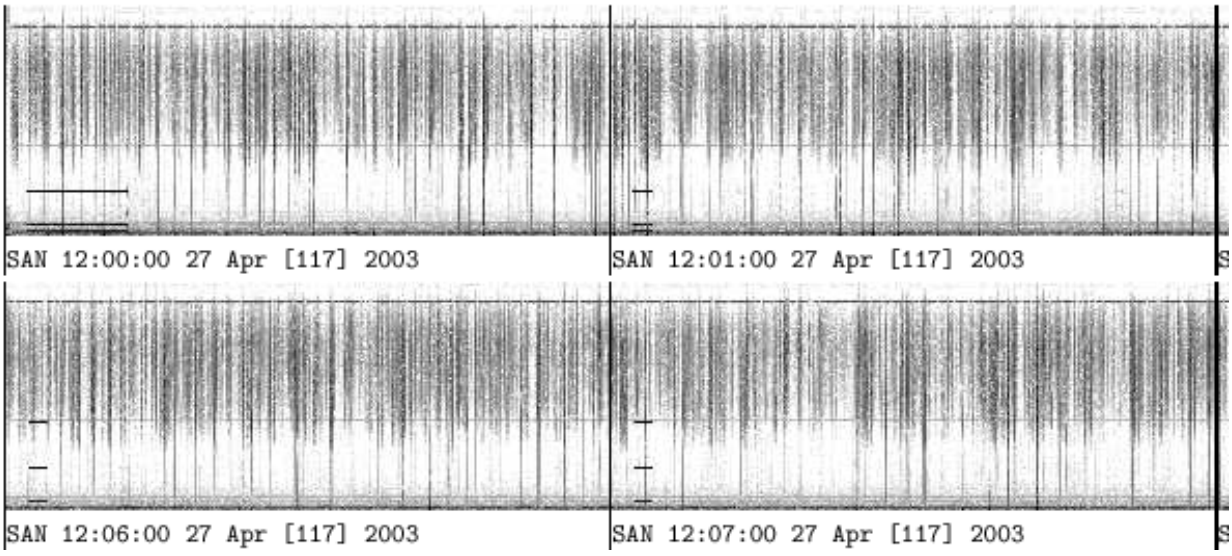


1301-1302 UT

Andrew also provided a PDF file containing spectrograms of his data.



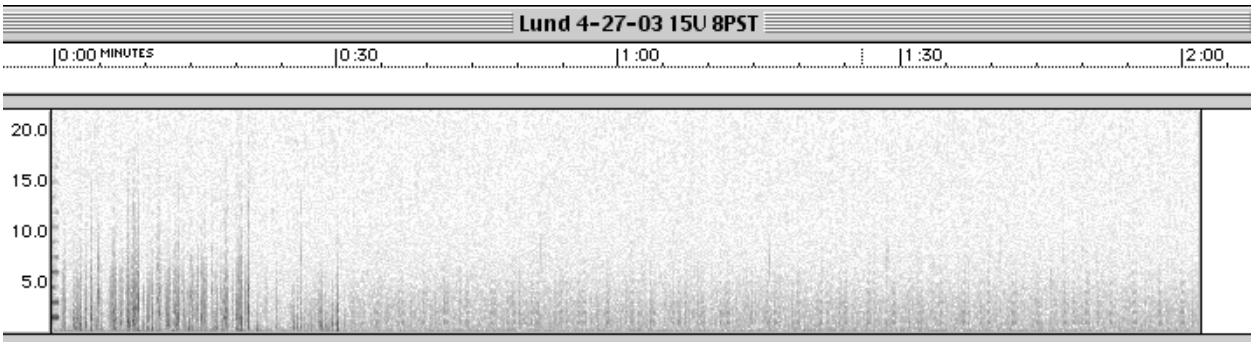
This is the first 12 minutes starting at 1200 UT..



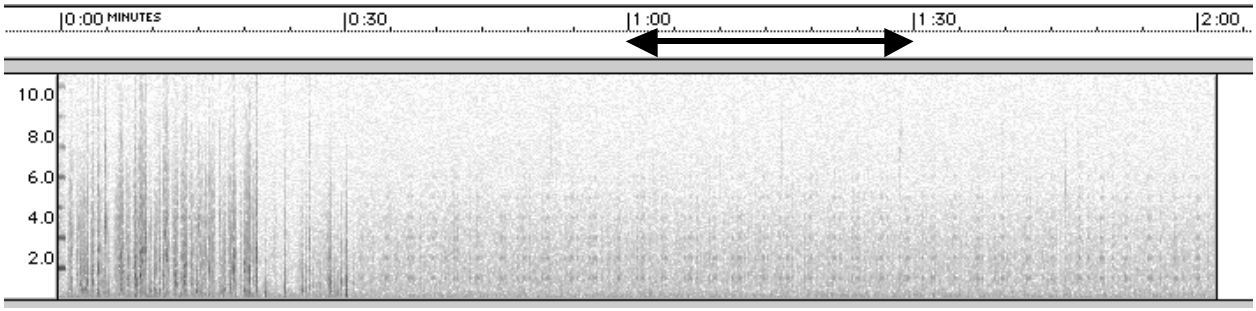
This is a close up showing detail from the four minutes in the upper left corner above.

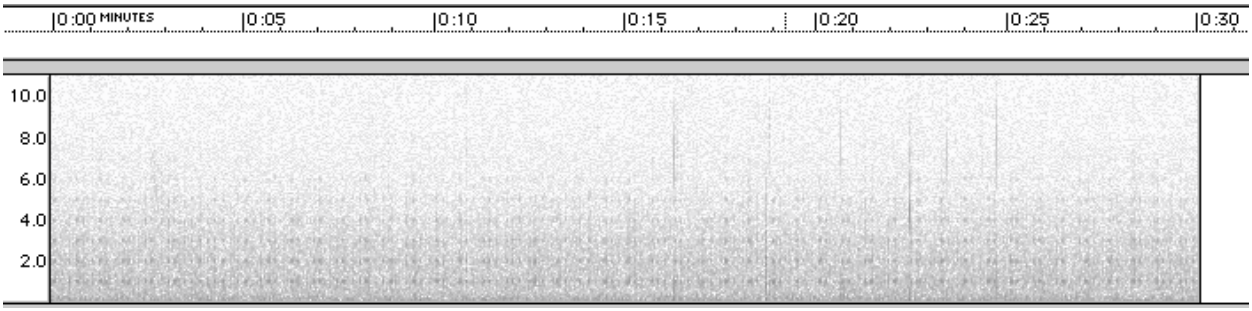
4-27-03 Loren Lund Union Gap, WA
LaSalle High School

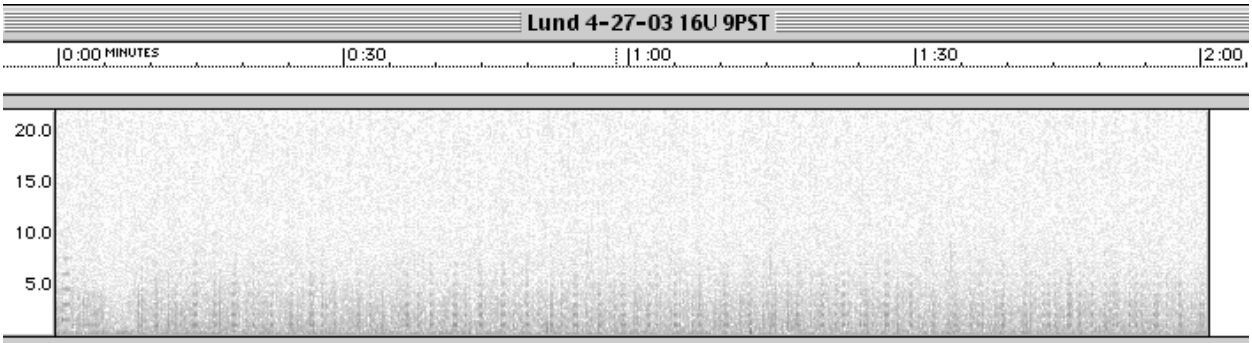
Loren and his son, Brian, observed on Sunday, April 27, 2003.



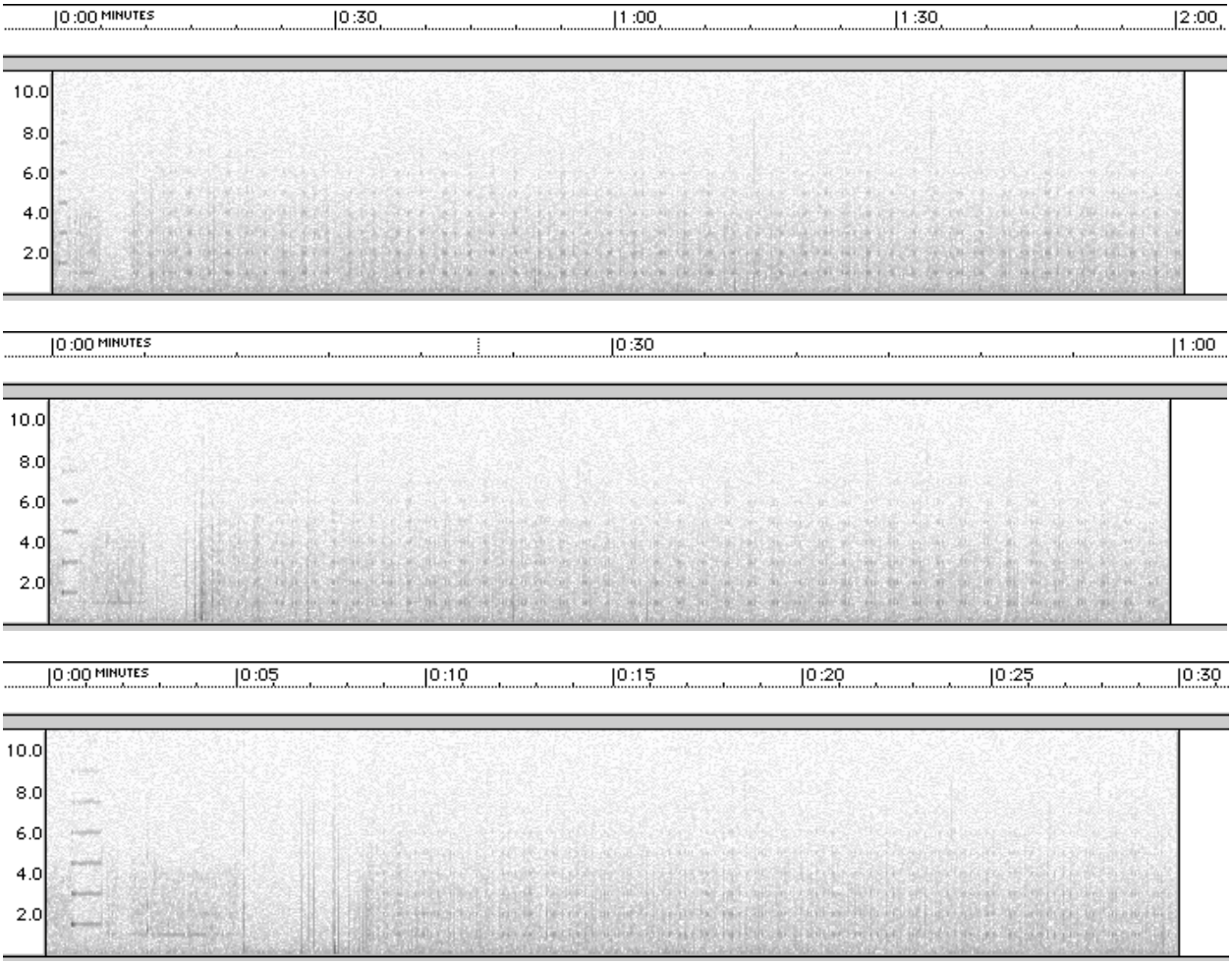
WWV appears for the first 30 seconds followed by VLF data. Sferics appear prominently, but at low density.. LORAN is also present indicating that the receiver is working well.







Lund



WWV appears at the start. LORAN shows up as horizontal rows of dots.